3.9 Social and Economic Conditions

This section of this Programmatic SEIS provides an overview of the human environment associated with the groundfish fisheries managed by the NOAA Fisheries under the BSAI Groundfish FMP and under the GOA FMP. The overview of the human environment is presented in eight sections as described below.

Historical Overview

The introduction and overview section provides a brief history of the groundfish fisheries in the North Pacific from as far back as the 1800s to today. This history includes a discussion of the groundfish fisheries as they evolved from traditional fisheries to commercial fisheries. This information provides a historical link to how the fisheries of the current day have formed. It includes a discussion of important influences from foreign exploitation to technological advances and provides a brief discussion of major amendments and initiatives that have had a significant influence on the domestic groundfish fisheries. This includes management regulations from before the enactment of the 1976 Fishery Conservation and Management Act (renamed the Magnuson-Stevens Fishery Conservation and Management Act [MSA] when amended in 1996) to today. The overview also provides information on fisheries dominated by large offshore foreign fishing and processing vessels, through the days of the joint venture fisheries, to the modern era characterized by U.S.-owned fishing and processing vessels and processing plants located in the coastal regions of Alaska.

Harvesting and Processing Sector Profiles

The harvesting and processing sector profiles section contains summary profiles of nine classes of catcher vessels, five classes of catcher-processors, seven classes of inshore processors, and motherships. The sector profiles provide information on each class's involvement and dependence on Alaska groundfish fisheries and link fishing and processing activities to communities and regions in Alaska, Washington, and Oregon. The separate profiles are preceded by an overview of the activities of catcher vessels, catcher-processors, inshore processors, and motherships in Alaska groundfish fisheries between 1992 and 2000. The summary profiles are condensed versions of more detailed sector profiles that were developed for NOAA Fisheries and the NPFMC in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries—2001* (Northern Economics November 2001).

Regional Socioeconomic Profiles

The regional socioeconomic profiles section contains summary profiles of six regions in Alaska, Washington, and Oregon that have particular interest in the harvesting and processing of North Pacific groundfish. Four of the regions are in Alaska and cover the coastal areas, the Alaska Peninsula and Aleutian Islands, Kodiak, Southcentral Alaska, and Southeast Alaska. A single region in Washington State is defined that includes counties bordering the state's inland marine waters. The final region includes three coastal counties in Northwest Oregon. The summary profiles are condensed versions of more detailed regional profiles in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries—2001* (Northern Economics November 2001).

Community Development Quota Program

The CDQ Program section provides a brief history of the development and qualifications of the community development quota program. This section covers the communities involved in the groundfish fisheries, as well as their purpose and accomplishments. The summary profile of CDQ communities is condensed from the detailed profile in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries—2001* (Northern Economics November 2001).

Subsistence

The subsistence section provides a summary of existing conditions and activity levels of the regionally important groundfish communities of the Alaska Peninsula and Aleutian Islands, Kodiak, southcentral Alaska, and Southeast Alaska. It covers the subsistence use of Stellar sea lions in relation to the central role Steller sea lion population dynamics have played in recent groundfish fishery management strategies and on some future management approaches. Lastly, this section includes other relevant subsistence activities including subsistence salmon fisheries, and joint production opportunities.

Environmental Justice Existing Conditions

The environmental justice existing conditions section provides an overview of the regulatory context and how it applies to this Programmatic SEIS. This section covers Alaska groundfish communities that have substantial environmental justice implications including communities with the highest level of engagement in and dependence upon groundfish-related activities, demographics of the workforce, population attributes, subsistence, and CDQ issues.

Market Channels and Benefits to U.S. Consumers

This section first provides a summary of the primary products derived from the Alaska groundfish fisheries and a brief overview of secondary processing and product distribution activities. Next, the difficulties of tracking the movement of groundfish products to their final point of sale are examined. Lastly, available data are used to summarize the product flows and markets for pollock, Pacific cod, sole, and rockfish.

Non-Market Goods and Services

The non-market goods and services section provides a discussion of possible non-market goods and services that may be directly or indirectly affected by the Alaska groundfish fisheries. The categories of economic values section outlines possible values that individuals attribute to market or non-market goods and services. The next three subsections examine these categories of values as they relate to three particular resources: groundfish, the Steller sea lion and the marine ecosystems of the BSAI and GOA. The alternative value paradigms section discusses values that lie outside the categories of values subject to economic investigation but that may be relevant to decision-making. These values are presented by their proponents as moral imperatives and, thus, do not lend themselves to analyses of economic tradeoffs.

3.9.1 Historical Overview

Development of North Pacific Fisheries (All Species)

1800s-1930s

The development of the North Pacific fisheries began with the discovery of fisheries for subsistence use. Aboriginal reliance on fish for food and trade existed long before the first Asian and European explorers and exploiters arrived off the shores of Alaska. These Native subsistence fisheries have traditionally focused on nearshore species such as salmon, herring, shellfish (molluscan and crustacean), and a few demersal or groundfish species such as cod, halibut, and rockfish. These subsistence fisheries account for small amounts of fish relative to the commercial fisheries, both of which continue in the present day.

The economic development of Alaska was based on Russian exploitation of fur seals, otters and other fur bearing animals. The first small-scale fishing enterprise began in 1785 at the Karluk River on Kodiak Island to provide dried salmon to the Russian fur traders. Cod is the first commercial fishery reported in 1864 with a catch of nine tons from Bristol Bay by the American vessel *Alert*. In the 1860s, the commercial potential of salmon was discovered and a technique for large-scale canning of salmon was developed. The first salmon canneries were built in Alaska in 1878. In 1882, the Kodiak Island salmon cannery was built. In 1911, the commercial halibut fishery began in Southeast Alaska off the south end of Baranof Island. The market demand for halibut grew as the development of ice makers enabled fishermen to preserve the halibut long enough to make it available to markets in the east and midwest U.S.

As more and more fisheries were discovered it became essential to achieve conservation of fishery resources and equitable distribution of their benefits. This became obvious when, after Alaska was purchased from Russia in 1867, it allowed American fishermen to use the common-pool approach and to fish for cod without interference from the Russians. However, the few fisheries management regulations that existed in the early 1900s were focused on salmon fisheries. As the Alaska salmon industry developed, government agents began collecting taxes on processed salmon products. The U.S. Commission of Fish and Fisheries was created in 1871 to determine whether and to what extent commercial marine food fishes of the northeast had declined in abundance. The Commission was also to report to Congress the necessary measures to remedy this decline. It wasn't until 1904, during the Theodore Roosevelt administration, that the Commission's work concerned Alaska. Roosevelt ordered an investigation of the Alaska salmon fishery due to reported inadequacies of existing conservation measures and recommended laws and regulations. In 1924, Congress passed the White Act, which declared congressional intent that not less than 50 percent of the salmon should be allowed to escape the fishery. The White Act gave the Secretary of Commerce broad powers to regulate fisheries in Alaska's territorial waters.

In the late 1800s and early 1900s, Pacific cod, halibut, and to a lesser extent sablefish, were the targeted fisheries. Market demand and the ability to transport fish products to market from remote Alaskan locations at reasonable cost determined whether a specific fishery would develop, rather than the abundance or availability of a particular species to fishermen.

As Canada and the U.S. fished Pacific halibut from northern California through Alaska shortly before World War I, fishery officials, fishermen, and dealers from both countries began to express concern about increasing

amounts of gear and decreasing catch per unit of gear. Around 1913, Canadian and U.S. officials began to discuss the possibility of an international research and management agency. On March 2, 1923, the two nations finally ratified a halibut conservation treaty (Browning 1980). This treaty established a four-person International Fisheries Commission, granting it limited regulatory powers and a principal-in-charge to conduct halibut fisheries research. The new Commission imposed an annual closure of the fishery from November 16 to February 15 to protect spawning halibut (Browning 1980). The treaty was renegotiated in 1930 and 1937 to enhance the Commission's regulatory power, and in 1953 a treaty revision changed the name to the IPHC.

Development of Groundfish Fisheries (Dominated by Foreign Fisheries)

1940s-mid 1970s

The increased catching power of trawl gear, coupled with the advent of powered refrigeration and gear-handling equipment, electronic navigation, and other technologies, first posed a threat to the traditional Alaska fisheries for Pacific salmon, Pacific cod, sablefish, and halibut. However, these technologies eventually opened fisheries for lower-valued groundfish species, such as flatfish and pollock, because the trawl gear allowed harvesting of larger volumes of fish. This is reflected in the early fisheries regulations.

The State of Alaska has management authority for fishery resources within state territorial waters (3 miles offshore) by virtue of the Submerged Lands Act of 1953. Prior to statehood in 1959, all regulations affecting the groundfish fisheries were federal and implemented by the Bureau of Commercial Fisheries. These federal regulations focused on implementing licensing and reporting requirements, but also limited the type of gear that could be used at certain times and in certain areas.

A very robust foreign groundfish fishery operated off Alaska long before the MSA was passed in 1976. Japan fished the Bering Sea for Pollock from 1933 to 1937, for yellowfin sole during 1940 and 1941, and for flatfish in the early 1950s. Japan also fished the GOA for Pacific ocean perch in 1960 and for flatfish in the GOA in 1963. The Soviet Union sent exploratory fleets to the Bering Sea in 1958 and commenced commercial operations in 1959 on yellowfin sole and red king crab, and then expanded into Pacific Ocean perch and herring in 1960. The Soviets moved into the GOA in 1964 and decimated Pacific ocean perch stocks before moving onto new fishing grounds off Washington and Oregon. The Republic of Korea (South Korea) began fishing in the Bering Sea in 1967 and in the GOA in 1972. Poland sent one stern trawler to fish briefly in the GOA and Bering Sea in late 1973. Taiwan commenced operations off Alaska in 1974 and 1975, trawling for Pollock and gillnetting for salmon in the central and EBS, and longlining for sablefish off Southeast Alaska. The late 1960s to the early 1970s represents a period of unregulated overfishing of groundfish resources off Alaska plus gear conflicts between foreign trawl fisheries and domestic pot fisheries for crab and longliner fisheries for halibut.

In the early 1960s, the U.S. had fisheries authority to only 3 miles off Alaska's coast; even within this 3 miles, waters were only closed to all foreign fishing. The U.S. thus had little leverage to restrict large offshore Japanese and Soviet operations during their initial build-up. Exchange of fisheries research and information was initially conducted with Japan and Canada under the auspices of the INPFC. However, the INPFC focused primarily on salmon interception issues.

Other than the limited regulations imposed by the State of Alaska, however, the U.S. had virtually no authority to impose restrictions beyond its territorial sea. The Truman Proclamation of 1945 asserted the nation's right to adopt conservation measures and to require foreign nations to comply with them. However, the U.S. did not extend its jurisdiction over fisheries beyond its 3-mile-wide territorial limit until 1966, when enactment of Public Law 89-658 extended the exclusive jurisdiction of the U.S. over fisheries from 3 miles to 12 miles offshore (Miles *et al.* 1982). Although the establishment of the 9-mile contiguous fishery zone (CFZ) under this law was a harbinger of the ultimate fisheries jurisdiction claim of 200 miles ten years later with the MSA, it was relatively ineffective in controlling the growth of foreign fishing capacity and groundfish harvests off the coast of Alaska.

Transition to Joint Venture Vessels

mid 1970s-late 1980s

The 1976 Magnuson Fishery Conservation Management Act (renamed the MSA when amended in 1996) established a mechanism to Americanize the off-shore fishery. The MSA assigned the NOAA Fisheries and the regional fishery management councils the responsibility of managing the fisheries in the Fishery Conservation Zone now called the U.S. EEZ that extends out 200 miles from the seaward boundaries of all coastal states. In the North Pacific, NOAA Fisheries and NPFMC took over management of a groundfish fishery that was largely unmanaged and open to all who wished to participate. Americanization of the groundfish fisheries was enhanced by actions of NPFMC and NOAA Fisheries that provided domestic harvesters and processors a priority over foreign interests. The development of the domestic groundfish fishing and processing industries was a high priority of Congress and NPFMC and therefore of NOAA Fisheries. To achieve this NPFMC developed two FMPS authorized by the MSA. The groundfish FMP for the GOA was approved by NPFMC and adopted and implemented by NOAA Fisheries in 1978. It established broad management goals and principles. The FMP provided regulations that defined groundfish species and prohibited species, and established a process for determining OY and setting harvest guidelines. A similar FMP for the BSAI was approved in 1982.

Figure 3.9-1 dramatically demonstrates the magnitude of the foreign fisheries in the EEZ off Alaska and provides an indication of the development of domestic fishing and processing infrastructure that would be necessary to fully Americanize the groundfish fisheries off Alaska. It shows the total harvests of all major Alaska fisheries by the domestic fishing and processing industry from 1975 through 1980. Domestic harvests were minimal for groundfish, compared to salmon and crab, accounting for less than 6,000 of the 262,000 mt harvested in the domestic fisheries. The value of groundfish harvests is estimated to have accounted for only 0.2 percent of the total value of domestic fisheries in Alaska in 1980. Figure 3.9-2 shows the same data for the years 1977-1980, but adds harvests of groundfish in the EEZ by foreign fishing vessels.

From 1976 until the late 1980s, a variety of federal laws and programs were developed to promote the "Americanization" of fisheries inside the U.S. EEZ, especially the rich groundfish resources of the Bering Sea (NMFS 2002). A start toward this was made in the early 1980s with the advent of what was known as the "Fish-and-Chips" policy. Fish-and-Chips tied foreign fishing privileges in the EEZ to commitments by the foreign entities to purchase the products of the U.S. seafood industry. A parallel program sponsored by NOAA Fisheries, the Fisheries Obligation Guarantee Program, guaranteed more than $150 million worth of loans between 1977 and 1996 for the construction of U.S. catcher-processors and inshore floating

processors. This program lowered capital investment costs relative to competitive market rates, thereby encouraging capital investment in the North Pacific groundfish fisheries and other U.S. fisheries.

The time period of 1978 to 1990 became a transition period to JV. The MSA enhanced the management actions of NPFMC and NOAA Fisheries. Domestic processors were surveyed in the fall each year. The survey results assisted in allocating the domestic annual processing (DAP) for the year, which was estimated by the total allowable level of foreign fishing (TALFF). Domestic processors were allocated the DAP if it was less than the total allowable harvest. The DAP directly reduced the TALFF. In addition to domestic processing priority, a DAH was created. If U.S. fishing vessels wished to participate in groundfish fisheries, they were also given a priority over TALFF regardless of whether domestic processors were involved. The creation of the DAH led to joint venture processing operations between U.S. fishing vessels and foreign motherships. Under these incentives, the Alaska groundfish fishery transitioned from almost entirely foreign to joint ventures to a completely domestic fishery in 1991, with 100 percent of groundfish harvested and processed by U.S.-owned vessels or shorebased processing plants in Alaskan communities. This dramatic expansion of the domestic fishery was financed, in large part, by a flood of foreign capital into new vessels and processors (After the passage of the Commercial Fishing Industry Vessel Anti-Reflagging Act of 1987, fishing and processing vessels were required to have at least 50 percent U.S. ownership, but no similar ownership requirements were imposed on shore-based processors—all shorebased processors on Alaskan soil were considered domestic regardless of the actual ownership of the facility).

As shown in Figure 3.9-3, the transition from foreign fishing and processing to U.S. fishing and foreign processing with JV processors occurred in the early 1980s. JV processors operations peaked in 1987 and TALFFs were eliminated by 1988. In 1986 the transition to domestic processing began to accelerate, and by 1989 DAPs exceeded JV processors. The last JV processors operations occurred in 1990.

Much of the early development of domestic processing came in the form of U.S.-owned catcher-processors and offshore motherships. In 1990, nearly 1.37 million mt of groundfish were processed at sea by domestic catcher/processors and motherships, compared to 0.44 million mt processed by shorebased processing facilities. By 1991, the amount of groundfish handled by domestic processors was nearly 10 times greater than the amount of salmon, crab, halibut, and other species combined. The peak groundfish catch during that year occurred, in part, because blend estimates of catch and bycatch were not yet used to monitor most quotas.[1] If they had been, several fisheries would have been closed earlier in the year (Hiatt *et al.*, 2001).

The growth and relative importance of the domestic processing of groundfish is demonstrated in Figure 3.9-4. Between 1992 and 2000, groundfish accounted for approximately 85 percent of the total volume of fishery resources harvested in the commercial fisheries of Alaska. Figure 3.9-5 shows the growth and relative importance of the domestic groundfish fisheries in terms of wholesale product value. From 1977 through 2000, groundfish has developed to be the single most valuable resource for domestic processors, accounting for more than 45 percent of total wholesale value of all Alaska fishery resources.

As noted above, foremost within the overall rapid development of the groundfish fishery was the at-sea processing, or factory trawl fleet (NMFS 2002). Other sectors, including onshore processing plants and

[1] All catch data reported after 1990 are based on the blend estimates of total catch which are used by NOAA Fisheries to monitor groundfish and prohibited species catch quotas during each fishing year

harvesting vessels, existed prior to the development of the domestic pollock fishery, but they were involved in other fisheries. By 1990, there were more than 50 factory trawlers participating in the BSAI pollock fishery, along with several motherships and four major shoreside plants. The new domestic factory trawler fleet alone brought enough capacity to the BSAI pollock fishery to catch and process considerably more pollock than allowed under the TAC. The inshore processing industry, supplied by smaller, mostly independent catcher vessels, also had considerable excess capacity. Estimates of harvesting and processing capacity in the pollock fishery suggested that perhaps two or three times more capacity existed in the fishery than would be required to "efficiently" harvest and process the TAC (NMFS 2002). Nearly a year-round fishery in the early to mid-1980s, the pollock fishery shrank to less than 60 days by 1992, in the face of a steady, or slightly increasing, quota.

Domestic Fishery and Management Objectives

Early 1990s-Present

During the transition, NPFMC and NOAA Fisheries became increasingly aware that managing a largely foreign fishery and allocating fishery resources among foreign and domestic interests were much easier than managing a purely domestic fishery and allocating fishery resources among competing U.S. interests. When fishery managers impose regulations that may have negative economic consequences for one sector while providing positive economic consequences for another, it becomes difficult to allocate resources between domestic users. The fisheries became fully domestic under a democratic allocation system, a process developed by NPFMC. It was becoming increasingly clear that rapid expansion of the domestic fleet under open access was creating conditions that led to a race for fish. Under TALFF and JV processors fisheries, open access and the race for fish was not a problem. From the perspective of NOAA Fisheries, the foreign fishery was essentially managed with individual quotas, and a race for fish did not exist. Following the NPFMC decision to implement IFQs in the sablefish and halibut longline fisheries and allocate Pollock between inshore and offshore processors, they realized that the rapid Americanization of groundfish had created an overcapitalized, open access fishery that generated a profusion of fishery management issues. Some of these issues include allocation conflicts, gear conflicts, deadloss due to ghost fishing by lost or abandoned gear, excessive bycatch and discards, excess harvesting capacity, reduced product quality as reflected in prices, poor safety, lack of economic stability for fishery participants and communities, and a lack of rural coastal community development (NPFMC 1991a). The IFQ program for halibut and sablefish was intended to address these issues. The IFQ is one means to limit entry in order to reduce overcapitalization and the wasteful practices that occur under other systems.

As part of the inshore-offshore pollock allocation, the first CDQ program to be implemented was recommended by NPFMC in 1992. The NPFMC had previously adopted (in 1991) a CDQ allocation for the Pacific halibut and sablefish fixed-gear fisheries as part of the IFQ program for these fisheries but this was not implemented until 1995. The first CDQ pollock harvests were made in December 1992. Initially 7.5 percent of the BSAI pollock TAC was allocated to the CDQ program. The overall allocations are divided among the communities based on recommendations of the State of Alaska. In 1995, the program was expanded by the NPFMC to include allocations for king crab, Tanner crab, and other groundfish species. The expanded multi-species CDQ program was authorized by Congress in 1996 and fully implemented in 1998. (see Section 3.9.4)

In October 1998, Congress enacted the AFA which has had a profound effect on the management of groundfish fisheries in the BSAI and, to a lesser extent, the groundfish fisheries in the GOA. The AFA subsumed NPFMC action in June 1998 to change the inshore-offshore allocation. After increasing the CDQ allocation of BSAI pollock to 10 percent of the TAC and providing for bycatch amounts in other fisheries, the AFA shifted just over 10 percent of the BSAI pollock TAC from motherships and factory trawlers to inshore processors, which include processing plants on land and floating processors anchored near shore. A profound change brought by the AFA was the creation of a pollock factory trawlers cooperative called the Pollock Conservation Cooperative (PCC). A group of catcher vessels that delivered fish to these factory trawlers also was able to form a separate cooperative. The formation of these cooperatives allowed the factory trawlers, and catcher vessels that deliver to them, to allocate among themselves the offshore factory trawler sector's share of the pollock TAC each year until December 31, 2004.

In response to the rapid Americanization, NPFMC initiated a Comprehensive Rationalization Program in 1992. The NPFMC's main concern is to "maintain the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. In addition, NPFMC must address the competing and oftentimes conflicting needs of the domestic fisheries that have developed rapidly under open access, fisheries which have become over capitalized and mismatched to the finite fishery resources available" (Problem Statement RP).

In the years following Americanization of the fisheries and initiation of the Comprehensive Rationalization Program, several amendments were approved that have resulted in limiting the number of participants and the types of activities in which they engage.

The ban on roe stripping (Amendment 19 to the GOA FMP and Amendment 14 to the BSAI FMP) and allocation issues would soon become increasingly bitter disputes. The first hint of these consequences occurred with the allocation of sablefish among gear types in the GOA under Amendment 14.

A moratorium on new harvesting vessels entering the groundfish fisheries was implemented through GOA Amendment 28 and BSAI Amendment 23. The moratorium reduced the possibility of significant increases in the number of large-capacity harvesting vessels activity participating in the groundfish fisheries.

Allocations of pollock between inshore and offshore sectors were approved and implemented in 1992. Amendment 18 to the BSAI FMP set aside one half of the pollock reserve (7.5 percent of the BSAI pollock TAC) for CDQ harvest, allocated 35 percent of the remaining BSAI pollock TAC to vessels catching pollock for processing by the inshore component and 65 percent of the remaining BSAI pollock TAC to vessels catching pollock for processing by the offshore component. Amendment 18 also established a catcher vessel operational area in which catcher-processors and motherships were prohibited from engaging in directed fishing for pollock during the B Season (September 1 to November 1). Amendment 23 to the GOA FMP allocated 100 percent of the GOA pollock TAC to vessels catching pollock for processing by the inshore component. Amendment 23 also allocated 90 percent of the GOA Pacific cod TAC to vessels catching Pacific cod for processing by the inshore component, and 10 percent of the GOA Pacific cod TAC to vessels catching Pacific cod for processing by the offshore component. The inshore and offshore allocations reduced the possibility that processing by one sector (inshore or offshore) could negatively affect harvesting and processing by the other sector. However, open access conditions and excess capacity continued in both the inshore and offshore sectors resulting in intense competition and potential economic instability.

An allocation of the BSAI Pacific cod harvests between jig, fixed gear, and trawl fisheries was implemented through BSAI Amendment 24. This amendment was reauthorized in 1996 (Amendment 46) with changes in the allocation and an additional split between trawl catcher vessels (TCVs) and trawl catcher-processors. Amendment 64, approved in 1999, further subdivided the fixed gear portion of the BSAI Pacific cod fishery among longline catcher-processors, longline catcher vessels, and pot gear vessels. The Pacific cod allocations in the BSAI provided trawlers and fixed gear vessels a fixed percentage of the fishery, and eliminated the threat that the harvesters of one gear group would impinge on the harvests of the other.

The NPFMC Groundfish LLP was approved in 1995, further reducing the number of vessels eligible to participate in the groundfish fisheries. The LLP also added the remaining groundfish species in the BSAI to the CDQ program. Amendments in 1998 and 2000 have placed additional restrictions and qualification criteria on licenses. The CDQ portion of the LLP was implemented in 1998 and first licenses were issued in 2000. The LLP removed additional amounts of the groundfish harvest from the open access fishery and further reduced the possibility of an increase in harvesting capacity that could erode the expectations of currently participating vessels.

With the approval and implementation of the AFA of 1998, the open access nature of the Pollock fishery in the BSAI was virtually eliminated. The number of vessels and processors allowed to participate in the fishery was fixed, and each provided access to a fixed portion of the Pollock resource through a cooperative. The possibility that an AFA vessel or processor can have negative impacts on the ability of another AFA vessel or processor to participate in the BSAI Pollock fishery was minimized.

Summary of Historical Overview

The enactment of the MSA in 1976 established NPFMC and gave it authority to recommend to the Secretary of Commerce fishery management policies. By 1988, participation in the North Pacific groundfish fishery in the EEZ was limited to domestic fishing vessels and plants and foreign processor vessels in joint venture operations with American-owned catcher vessels. Joint venture operations were then phased out leaving the fishery fully "Americanized" by 1991. However, by 1988 domestic capacity was sufficient to harvest the groundfish TAC and was still expanding rapidly. This led to the race for fish. In 1996, NPFMC enacted the LLP, a more restrictive form of limited access. This in turn allowed in more vessels than were necessary to prosecute the fisheries, leading to several amendments to the BSAI and GOA groundfish FMPs. Amendments to FMPs and the race for fish led NPFMC to focus on limiting catches to sustainable levels and the various user groups to focus on securing shares of the TAC. Table 3.9-126 summarizes the effects of past/present events and actions on the harvesting and processing sectors. This information is also referred to as the comparative baseline.

The FMP amendments have included direct allocations of quotas for particular species or species groups to groups of vessels as delineated by gear type, vessel size, mode of operation, etc.

3.9.2 Harvesting and Processing Sector Profiles

This section presents data that summarize various aspects of the economic status of the groundfish fisheries in the U.S. EEZ off Alaska. Generally, data are presented for the harvesting and processing sectors of the groundfish fisheries for 1992 through 2001. The primary source of the economic information presented here

is the document, *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2001).

Section 3.9.2 is divided into four subsections:

1. Section 3.9.2.1 describes the key indicators used in this analysis to assess economic conditions in the harvesting and processing sectors.

2. Section 3.9.2.2 provides an overview of the major causes of economic change in the harvesting and processing sectors.

3. Section 3.9.2.3 describes the primary sources of economic data used in this analysis.

4. Section 3.9.2.4 presents profiles of the harvesting and processing sector classes identified for this analysis. Specifically, this subsection describes the activities of 1) various classes of catcher vessels — vessels that harvest groundfish and deliver their catch to processors; 2) various classes of catcher processors—vessels that both harvest and process groundfish; and 3) other types of processors—shore-based processors, floating inshore processors, and motherships that take deliveries of groundfish from catcher vessels.

3.9.2.1 Key Indicators of Economic Conditions in the Harvesting and Processing Sectors

The profiles of the harvesting and processing sectors describe the economic status of the Alaska groundfish fisheries in terms of various quantitative measures of economic activity and output using estimates of the size and composition of the groundfish fleet, the number and type of processing facilities, vessel and plant ownership, the amount of groundfish caught and retained, the ex-vessel value of groundfish landed, the quantity and value of groundfish seafood products, the number of people employed, and the payments to labor (also called labor income). Ex-vessel value is equal to the quantity of fish retained for processing multiplied by the ex-vessel (dockside) per unit price. This value represents both the gross revenues earned by harvesters and the costs of raw fish paid by processors. Gross product value is equal to the quantity of processed product multiplied by the wholesale product price after primary processing. This value represents the gross revenues earned by processors.

Other economic and social indicators examined in this analysis are described in more qualitative terms. These indicators include product quality, product utilization rate, harvesting and processing capacity, and safety of human life at sea. The analysis also includes a qualitative discussion of changes in average costs in the harvesting and processing sectors. However, the firm-level cost data required to estimate changes in net revenues (gross revenues less variable and fixed costs) are unavailable.

It is also important to note that a number of the indicators described above can serve as indicators for economic variables that are difficult to measure directly. For example, an estimate of labor payments is a surrogate measure of the contribution of the groundfish fisheries to a community's employment levels. Similarly, total and groundfish ex-vessel values by region of landing are subject to local and state taxes and, therefore, are indicators of the fishery-generated tax revenue that accrues to local and state governments. They are also a measure of the demand for shoreside support services by the groundfish fisheries.

3.9.2.2 Internal and External Factors Affecting Economic Conditions in the Harvesting and Processing Sectors

The economic performance of the Alaska groundfish fisheries is influenced by a variety of factors. For the purposes of this analysis, the conservation and management measures that regulate the fisheries are considered to be internal factors. As described in Section 3.9.1, certain management measures have dramatically affected economic conditions in the domestic groundfish fisheries as a whole or segments of those fisheries. These management measures include those implemented to prevent overfishing of groundfish stocks and to protect ecosystems as well as those measures designed to allocate the groundfish quota among various user groups and to enhance the economic efficiency of the fisheries.

The economic performance of the Alaska groundfish fisheries is also significantly affected by factors external to the regulatory regime. These factors include the domestic and foreign demand for groundfish products, economic conditions in other Alaska fisheries, the costs of harvesting and processing inputs—such as fuel and labor—and changes in fishing technology. Foreign and domestic demand, in turn, is a function of such factors as consumer preferences, the supply of competing products, foreign exchange rates, international trade agreements, demographics, and national income levels (Kinoshita *et al.* 1993).

The single most important of these demand-related factors is the food preferences of consumers. Shifting tastes in domestic and foreign markets can have a profound effect on the harvesting and processing decisions of fishery participants and the economic health of the industry as a whole. Among U.S. consumers, for example, the increased demand for seafood products that resulted from reports of the health benefits of eating fish and shellfish had a marked positive economic impact on certain segments of the domestic fishing industry, including harvesters and processors of Alaska groundfish. On the other hand, markets for Alaska groundfish thought to be stable and dependable—such as exports of pollock surimi to Japan—may change significantly in the future. One fish buyer interviewed for this analysis suggested that the demand for certain surimi-based products in Japan appears to be declining along with the demand for other traditional foods.

Another especially important variable in the market for Alaska groundfish products is the pollock harvest in Russian waters (NMFS 2001). Russia has accounted for more than half of total world harvest of pollock, and vessels of other nations fishing in Russian waters also catch significant volumes. These foreign harvests compete directly with U.S. harvests in international markets for Alaska pollock products. In the past several years the TAC in Russia has been reduced each year. However, there is general consensus that the Russian stock of Alaska pollock has been overfished. Adding to this is financial difficulty in the Russian fishing industry. It is likely that harvests from Russian waters will decline even further before they stabilize; one estimate suggests it may be at least 2005 before stocks recover from overfishing The declining trend of harvests from Russian waters suggests a favorable market outlook for pollock from the EEZ off Alaska over the next few years due to tightening world supply.

A third important exogenous factor related to markets for groundfish is foreign exchange rates. With the large amount of groundfish that is exported from the fisheries off Alaska to Japan, the strength of the Japanese yen relative to the U.S. dollar can be a powerful force in the market for groundfish and other Alaska seafood products. The major collapse of the economy in southeast Asia during the late 1990s led to an economic slowdown in Japan, which caused Japanese consumer demand to slow (NMFS 2001). The yen weakened significantly, and the exchange rate dropped to a low of 144 yen per dollar in August 1998. The weak yen

and slackened demand placed great pressure on Alaska producers. The economy has since recovered somewhat, and the Japanese yen has strengthened against the dollar.

The economic status of the Alaska groundfish fisheries is also heavily influenced by other Alaska fisheries. These fisheries may provide fishing opportunities to vessels and processors participating in the groundfish fisheries, intercept or otherwise affect groundfish stocks and harvest quotas, and provide other sources of employment and tax revenue for local communities. The fisheries that have the greatest potential effects are crab (tanner and king), salmon, halibut, and state groundfish fisheries. Several classes of catcher vessels and inshore processors (shore-based processors and floating inshore processors) currently rely to a certain degree on the harvest from these fisheries. In some communities the processing sector handles a range of products (e.g., groundfish, crab, and salmon), while in other communities the processors are more specialized. Fisheries other than those occurring near Alaska, such as the Pacific whiting fishery off Oregon and Washington, are also important for several catcher vessels, catcher processors, and motherships.

Finally, the economies of the communities in which processors are located or from which harvesters operate also have an effect on economic conditions in the Alaska groundfish fisheries. The economic development activities that have the greatest potential effect are State of Alaska and Federal oil and gas exploration/ production, defense industry projects, tourism and the construction and operation of marine or air-related transportation facilities. Non-fishing economic activities within coastal communities may compete with the groundfish industry for labor, services, and facilities. Alternatively, they can provide supplementary employment and income-generating opportunities for fishermen, processors, and others involved in the fishing industry.

3.9.2.3 Data Sources and Methodology

The fisheries data collection system used to monitor the groundfish fisheries has changed significantly over the past twenty-five years. When the MSA was implemented in 1976, the groundfish fisheries were dominated by foreign catcher processors and motherships. To monitor fishing activity, NOAA Fisheries required the vessel operators to record activities in logbooks. U.S. observers on the vessels reported catch estimates and logbook entries weekly. This system of reporting continued into the 1980s, when much of the groundfish catch was harvested by domestic catcher vessels and delivered to foreign processing vessels in joint venture operations. Deliveries by domestic catcher vessels to inshore processors were reported by means of ADF&G groundfish fish tickets.[2] Catcher processors were also required to submit fish ticket reports of groundfish catches to the ADF&G, but these vessels could stay at sea for long periods, and thus did not report as frequently as catcher vessels. With the rapid expansion of the domestic catcher processor fleet, it became apparent that a mechanism for timely reporting of catches by this fleet was needed. By 1987, NOAA Fisheries required weekly reports of groundfish caught in the EEZ and processed at sea from all catcher processors and motherships regardless of how long their catch was retained before landing. Currently, both at-sea and inshore processors are required to report estimates of all harvests and deliveries on a weekly basis using the Weekly Production Report (WPR).

[2] Fish tickets record landed weight and value by species. A fish ticket is considered a legal document and requires the signature of the permit holder (captain or operator) and the receiver (buyer).

In 1990, the groundfish FMPs for the GOA and EBS were amended to establish mandatory observer coverage requirements for vessels and plants involved in the groundfish fisheries. With some exceptions, those amendments require vessels 125 feet or longer to carry an observer 100 percent of the time while fishing for groundfish; vessels 60-124 ft long to carry an observer during 30 percent of their fishing days in each calendar quarter of the year in which they fish more than 10 days; plants processing 1,000 or more metric tons in a month to have an observer in the plant each day they process groundfish; and those processing 500-1,000 mt to have observers 30 percent of the days. Since 1992, NOAA Fisheries has based all estimates of catch in the groundfish fisheries on a blend of observer data and WPR data.

Estimates of total catch for the processor profiles presented in this analysis were derived from the NOAA Fisheries blend data. NOAA Fisheries WPR data were used to derive final product estimates. The product price information provided by NOAA Fisheries was based on data collected by the State of Alaska in the Commercial Operators Annual Reports.

Data for catcher vessels that delivered to inshore processors are primarily from fish tickets collected by ADF&G. Analysts from NPFMC parsed the fish ticket records such that only records of deliveries to inshore processors were included. These data were available for 1988 through 2001.[3] Data for the years before 1988 were not available because it was not feasible to adequately parse the data voluntarily submitted by catcher processors and motherships. Including such information could result in double counting errors.

Fish ticket data do not fully account for fish that have been discarded. To provide a consistent set of information only harvests retained by inshore processors have been included in the catcher vessel profiles. The fish ticket information provided by NPMFC included estimates of the ex-vessel value of each delivery.

While deliveries to inshore processors are recorded on ADF&G fish tickets, at-sea deliveries to motherships are monitored by observers. However, these observers do not routinely record the species composition of deliveries made by individual catcher vessels. To estimate the species composition of deliveries to motherships, observer data for individual catcher vessels were combined with NOAA Fisheries blend data for motherships. The blend data were used to estimate the monthly average species composition for each mothership, while the observer data were used to estimate the monthly catch delivered by each catcher vessel. The average species composition of each mothership was assigned to the catch of each of its catcher vessels so that the sum of the amount of each species delivered by all of the catcher vessels equaled the total quantity of fish received by the mothership.

The ex-vessel value of at-sea deliveries must be estimated. Unlike data for deliveries to inshore processors, there is no regularly collected information on prices paid for deliveries at sea prior to 2000.[4] To estimate at-sea ex-vessel value this analysis used the following formulaic approach validated by industry sources in June and July 2000:

- The at-sea ex-vessel price of pollock and Pacific cod is 87.5 percent of the price paid for deliveries inshore. Payments are only for that portion of the catch retained by the mothership.

[3] The catcher vessel profiles use ADF&G fish ticket data from 1992 to 2001 in order to be consistent with processor profiles.

[4] Beginning in 2000, at-sea deliveries by catcher vessels were required to be reported on ADF&G fish tickets.

- The at-sea ex-vessel price of all other species is 40 percent of the first wholesale value of the mothership's final product. Other than pollock and Pacific cod, few groundfish species were retained by motherships between 1991 and 2001.

Catcher vessel ownership and address information from Commercial Fisheries Entry Commission vessel registration files and NOAA Fisheries Federal permit data was used to assign income and employment estimates from the groundfish fisheries to regions in Alaska, Oregon, and Washington. Processor ownership and address information from NMFS Processor Permit data and from ADF&G Alaska Seafood Processor and Exporter License and Permit data was used to assign processors to regions. Because of inconsistencies in the ownership data in early years, the analysis assigned processor ownership to the region indicated in the most recent data available for each processor.

The catch data sets contain many instances of incidental groundfish catch reported by catcher vessels and processors participating in non-groundfish fisheries. Vessels fishing for halibut, for example, are required to land incidental catches of Pacific cod and rockfish. In an effort to focus the analysis on harvesting and processing operations with a significant involvement in the groundfish fisheries, threshold limits were established for catcher vessels and catcher processors. The threshold limits varied by gear and vessel length. Vessels that had landings below these limits were excluded from this analysis. In addition, inshore processors that acted as buying stations or were not associated with a given port were excluded. Unidentified vessels or catcher vessels that made catches below threshold limits accounted for approximately 0.6 percent of the value of the groundfish fisheries from 1992 through 2001.

Employment estimates for catcher processors and motherships are collected by NOAA Fisheries in WPR. For this analysis NOAA Fisheries provided information on the average crew size for each vessel and the number of weeks that each vessel was active between 1993 through 2000. Multiplying crew size by the number of active weeks provided an estimate of the number of crewmember weeks for each vessel. Assuming a work year of 52 weeks, crewmember weeks were translated into an estimate of Full Time Equivalent (FTE) employment. These estimates were increased by five percent to account for corporate office staff.

Employment estimates for inshore processors were derived in a different manner. WPR provided information on the volume of processed product for each inshore processor. These values were summed to obtain totals for each inshore processor class. The product volumes were then multiplied by coefficients representing the average tonnage of each product type that could be produced per labor hour.[5] The result is the number of labor hours to produce the product volumes. Using 2,080 hours as a standard work year (because many plant employees do not qualify for vacations and work on holidays), the FTE employment for each inshore processor class was estimated. The FTE employment estimates were increased by five percent to account for corporate office staff.

[5] The coefficients originated in the Fisheries Economic Assessment Model for Alaska (Jensen and Radtke 1990). They were first updated by Northern Economics, Inc. as part of a Fisheries Industry Model (FIM) prepared for the U.S. Department of Interior, Minerals Management Service (Northern Economics, Inc. 1990 and 1994). The coefficients were updated again by Northern Economics, Inc. in unpublished reports prepared for the City of Unalaska and City of King Cove that provided a revenue forecasting system for each community. The coefficients represent averages for processing facilities throughout the state, and substantial variation can occur across processor classes.

Inshore processing plant employment was assigned to the region in which the plant is located, with corporate office staff allocated to the region of the plant owner's residence. Because catcher processors and motherships generally operate beyond the jurisdiction of the State of Alaska, their total employment (vessel and corporate office staff) was allocated to the region of the vessel owner's residence. This method of assigning employment to regions is similar to that used by State and Federal agencies.

Estimates of employment on catcher vessels were derived from previous studies of crew-size for various vessel types and from interviews with industry representatives. Estimates of employment for a particular vessel class were made by multiplying the crew-size estimate by the number of active vessels in the class during each month. Crewmember months were converted to crewmember hours by assuming that crewmembers work an average of 16 hours per day for an average of 15 days in every month their vessel is active. The total number of estimated crewmember hours was then divided by 2,080 hours to obtain an estimate of FTE employment.

Payments to labor for both offshore and inshore processors were estimated by multiplying total wholesale production value by the percent of that value accounted for by processing labor. Studies by Northern Economics, Inc. (1990 and 1994) indicated that processing labor accounts for 20 to 30 percent of total wholesale production value for the various processor classes. The estimated payments to processing labor were increased by 10 percent to account for the salaries of corporate office staff. Payments to labor for catcher vessels were estimated assuming that labor costs are equal to 40 percent of ex-vessel value. All payments to labor for catcher vessels were assumed to accrue to the vessel owner's region of residence. Payments to labor for inshore processors, catcher processors, and motherships were regionally distributed in the same manner as described above for employment.

3.9.2.4 Sector Profiles

Profile Categories

The groundfish fisheries support a wide array of harvesting and processing operations. This analysis has grouped these operations into three groups representing 1) catcher vessels; 2) catcher processors; and 3) shore-based processors, floating inshore processors, and motherships. These groups have been further subdivided into twenty-one classes as follows:

- Nine classes of catcher vessels defined on the basis of fishing activities in a given year and vessel size.

- Five classes of catcher processors defined on the basis of the predominant product type or gear type associated with these vessels.

- Seven classes of shore-based, floating inshore, and mothership processors defined on the basis on the regional location of the facilities.

More detailed descriptions of each of these categories are presented in Table 3.9-1.

To further facilitate the organization and presentation of fisheries data, groundfish species were aggregated into four main groups, as shown in Table 3.9-2. Grouping species allows the analysis to provide a relatively uniform description of activities by vessel class and to report as much catch data as possible without violating NOAA Fisheries restrictions pertaining to release of confidential data .[6] In addition, seven geographic regions were defined to enhance the presentation of information on the linkages between groundfish harvesting and processing operations and coastal communities. These regional classes are presented in Table 3.9-3. Section 3.9.3 provides details on the socioeconomic relationship between the groundfish industry and communities and regions in Alaska, Washington, and Oregon. Finally, Table 3.9-4 defines the FMP areas and FMP subareas used to locate fishing effort in the groundfish fisheries.

Overview of Activities in Alaska Groundfish Fisheries

Economic conditions within the harvesting and processing sectors of the Alaska groundfish fisheries have undergone major changes over the past three decades. This section examines the historical context of economic conditions in the Alaska groundfish fisheries, as well as the possible agents of change. The description of historical trends is divided into two time periods. The period of 1977 to 1991 corresponds to the era of rapid development of domestic fishing and processing capacity following the enactment of the MSA. The years 1992-2001 follow the modification of the fisheries data collection system. All catch data reported after 1991 are based on the blend estimates of total catch which are used by NOAA Fisheries to monitor groundfish and prohibited species catch quotas during each fishing year. In addition, it is during this period that allocation issues among domestic fishery participants and the effects of the groundfish fisheries on the marine ecosystem received greater attention.

The availability and consistency of data limits the ability to analyze historical change in indicators of the economic condition of the Alaska groundfish fisheries, particularly during the years immediately following the implementation of the MSA. This analysis is also limited by the difficulty of delineating the cause-and-effect relationships between multiple factors and the resultant economic effects. As noted in Section 3.9.2.2, many factors substantially affect the economic status of the Alaska groundfish fisheries. Changes in markets, biological conditions and fishery management regulations can result in changes in the revenues and operating costs of firms participating in the fisheries as well as changes in fleet size and composition. Isolating the effects of a single factor is seldom possible, especially when data are presented for the groundfish fisheries as a whole. The effects of various factors are more easily discerned when the activities of individual catcher vessel and processor classes are described later in this section.

1977 to 1991 Period

As discussed in Section 3.9.1, the MSA was designed to promote the development of a U.S. offshore fleet through an allocation system that favored domestic vessels over foreign vessels and joint venture operations. During the 1980s, the groundfish fisheries in the U.S. EEZ off Alaska changed from being primarily foreign fisheries to fully domestic fisheries. Foreign fishing ended in 1987, and JV processing operations peaked in the same year. In 1986, the transition to domestic processing began to accelerate, and by 1989 allocations to

[6] NOAA Fisheries and State of Alaska policies regarding the protection of confidential data require that fisheries operations data be aggregated to include information from at least four individual operations. Because of the limited activity of some types of vessels in some regions, disclosure of less aggregated species data would have violated this confidentiality limitation.

domestic processors exceeded allocations to joint ventures. The last JV processing operations occurred in 1990.

Much of the early development of domestic processing came in the form of U.S.-owned catcher processors and offshore motherships. Trawls, longlines, pots, and other types of fishing gear were used in the domestic groundfish fishery. Annual catch for virtually every gear group, area, and species increased dramatically from 1982 to 1990. However, vessels using trawl gear to harvest pollock in the BSAI area accounted for most of the total groundfish landings. Catch for offshore processing was the largest and fastest growing component of catch. The number of domestic catcher processors increased from only three in 1986 to 50 in 1991. By 1990, nearly 1.37 million mt of groundfish were processed offshore by domestic catcher processors and motherships, compared to 0.11 million mt in 1986. The catch processed by shore-based facilities increased from 61,500 mt in 1986 to 463,400 mt in 1991. The relative catch of these two types of operations varied by area and species (Kinoshita *et al.* 1993). In the BSAI the catch processed offshore exceeded that processed by inshore facilities for each species. The opposite was true in the GOA, with the exception of rockfish and flatfish.

The majority of the total groundfish catch was harvested by vessels whose owners indicated that they were not residents of Alaska. Much of the early development of domestic harvesting processing of groundfish resources came in the form of catcher processors and offshore motherships based in Seattle.[7] However, the percentage of catch taken by vessels owned by Alaska residents was greater when measured in terms of ex-vessel value rather than in terms of weight. This is because vessels owned by Alaska residents caught a larger proportion of higher priced species such as sablefish.

By 1991, the amount of groundfish handled by domestic processors was nearly 10 times greater than the amount of salmon, crab, halibut, and other species combined. Also, groundfish replaced salmon as the highest value commercial fishery off Alaska in 1991. The peak groundfish catch during that year occurred, in part, because blend estimates of catch and bycatch were not yet used by NOAA Fisheries to monitor most quotas. If they had been, several fisheries would have been closed earlier in the year (Hiatt *et al.* 2001).

1992 to 2001 Period

Table 3.9-5 summarizes domestic harvesting and processing activity in the groundfish fisheries off Alaska from 1992 to 2001. More detailed information about each sector and region is contained in later subsections.

From 1992 through 2001, an average of 1,083 catcher vessels made landings of groundfish above threshold levels each year. In the same period, an average of 107 catcher processors and 68 motherships and inshore processors annually participated in the groundfish fisheries. The number of participants in the groundfish fisheries decreased substantially during the ten-year period. The cause of the decline is likely a combination of several factors, including the implementation of a vessel moratorium and license limitation program, quota allocations among participants in the groundfish fisheries, mandated vessel retirements under the American Fisheries Act, and changes in global markets for groundfish products.

[7] Most of the shoreside pollock processing capacity was built and owned by Japanese seafood companies.

Between 1992 and 2001, processors received groundfish with an average annual ex-vessel value of $244 million. Total groundfish harvests ranged from a high of 2.3 million mt in 1992 to a low of 1.6 million mt in 1999. Pollock accounted for approximately 66 percent of total reported harvests during the ten-year period. About 86 percent of total reported groundfish harvests were in the BSAI.

For the domestic groundfish fisheries as a whole, 94 percent of the 2001 catch was made by vessels with owners who indicated that they were not residents of Alaska (Hiatt *et al.* 2002). The catches of Alaska and non-Alaska residents were much closer to being equal in the GOA where Alaskan vessels accounted for the majority of the Pacific cod and sablefish catch.

An average of 580 thousand mt of product were produced from groundfish per year between 1992 and 2001. This equated to an average utilization rate (product tons divided by reported harvest tons) of 29 percent. The estimated average annual wholesale value of production was $1.2 billion between 1992 and 2001. During this period, the groundfish fishing and processing industry generated an estimated yearly average of 4,700 FTE jobs in Alaska and 5,300 FTE jobs in the Washington Inland Waters (WAIW) Region, with an estimated total average payment to labor of $589 million.

Overview of Other Indicators of Conditions in the Alaska Groundfish Fisheries

The preceding discussion examined historical conditions in the Alaska groundfish fisheries in terms of various quantitative measures of economic activity and output. This section provides an overview of three additional variables that are discussed in more qualitative terms: harvesting and processing capacity, average costs, and safety of human life at sea.

Harvesting and Processing Capacity. A detailed discussion of the issue of harvesting and processing capacity in the Alaska groundfish fisheries is provided in the qualitative analysis of overcapacity. A summary of portions of that analysis is presented here.

In simple terms, fishing capacity is the ability of a vessel or fleet of vessels to catch fish (NMFS 1999). This ability is a function of such factors as the number of fishing vessels in the fleet; the size of each vessel; the technical efficiency of each vessel (determined by factors such as on-board gear and equipment, fishermen's knowledge and techniques, and the size of the crew); and the time spent fishing (National Fisheries Conservation Center undated). Loosely speaking, overcapacity in a fishery occurs when the ability to catch fish exceeds what is needed to harvest sustainable yields. This condition can lead to intense fishing pressure on stocks, poor economic performance within the fishing industry, and inefficient use of labor and capital.

The rapid expansion of U.S. participation in the Alaska groundfish fisheries during the 1980s and early 1990s led to excess capacity in a number of these fisheries. The NPFMC responded in 1992 by initiating a comprehensive rationalization program. In the years following the initiation of the program, NPFMC and NOAA Fisheries, whether intentionally or unintentionally, progressively limited the number of participants in the Alaska groundfish fisheries and the types of activities in which they can engage. Major regulatory actions that affected capacity in the groundfish fisheries included the following management programs.

The sablefish and halibut longline fishery IFQ program was approved by NPFMC in 1991 and implemented by NOAA Fisheries in 1995. Quota shares were allocated within separate management areas and for specific

vessel size classes. Shares are marketable but can be sold or traded only within each management area, within the same vessel size category, and with restrictions on the total amount and type of quota held. In 2002, NPFMC amended the IFQ program to allow fishing villages in the GOA with fewer than 1,500 people to acquire quota shares for sablefish and halibut. The measure allows 42 villages to buy quota shares and lease them to resident fishermen.

The western Alaska CDQ program was created to provide fishermen who reside in western Alaska communities an opportunity to participate in the BSAI groundfish fisheries, to expand their participation in nearshore fisheries, and to help alleviate the poor economic conditions within these communities. Initially, the western Alaska CDQ program relied on an allocation of the annual pollock TAC in the Bering Sea. In 1993, NPFMC extended the community development quota to halibut and sablefish. The multi-species CDQ allocations, adding all remaining BSAI groundfish, prohibited species and crab, were implemented in 1998.

A moratorium on new harvesting vessels entering the groundfish fisheries was implemented in 1995. The moratorium reduced the possibility of significant increases in the number of large-capacity harvesting vessels actively participating in the groundfish fisheries.

Final implementing rules for NPFMC's groundfish North Pacific LLP were published in 1998, and the first licenses were issued in 2000. The LLP superceded the moratorium and further reduced the number of vessels eligible to participate in the groundfish fisheries. The LLP also established groundfish area and gear endorsements. Licenses under the LLP are generally transferable, but endorsements are not severable from the license. Licensed vessels can be replaced, but increases in the length of licensed vessels are limited in vessels under 125 ft and prohibited in larger vessels.

In 1998, Congress passed the AFA which, among other things, limited the number of harvesting and processing vessels that would be allowed to participate in the BSAI pollock fishery. Only harvesting and processing vessels that met specific requirements, based on their participation in the 1995-1997 fisheries, are eligible to harvest BSAI pollock. The AFA also established the authority and mechanisms by which the remaining pollock fleet can form fishing cooperatives. Within each cooperative, each member company is contractually allocated a percentage share of the total cooperative allocation based on its historical catch (or processing) levels. In practice, the cooperative system is similar to an IFQ system. However, the distribution of fishing privileges and the system for trading, selling or enforcing them is decided by the members of the separate cooperatives.

These measures have, at least in part, limited excess harvesting and processing capacity in the Alaska groundfish fisheries. As shown in Table 3.9-5, the number of participants in the groundfish fisheries has decreased substantially since 1992. Yet, as indicated by recent problem statements prepared by NPFMC, the measures have not been successful in eliminating excess capacity as one of the major management problems for these fisheries. A recent report by Felthoven *et al.* (2000) supports NPFMC's position that significant excess capacity remains in several Alaska groundfish fisheries. Under the current management regime, these fisheries are expected to continue to generate an important share of the total ex-vessel value of all domestic commercial fisheries. However, the use of the race for fish to allocate TACs and PSC limits and the high levels of excess harvesting and processing capacity in many of the groundfish fisheries are expected to significantly decrease the net benefits to the Nation from these fisheries.

Average Costs. The costs of operating a fishing boat include fuel, repairs and maintenance, wages of skipper and crew, protection and indemnity insurance, food and consumable supplies, bait, and ice. Because these expenses change with changes in the quantity of output produced they are referred to as variable costs. For some fishing vessels, fuel is the single largest variable cost. It is estimated that these costs represent approximately 10 to 15 percent of the variable cost (PSMFC 2003).

Crew members are paid on a share system, so labor costs depend on the quality and market value of the fish and the number of people receiving a portion of the proceeds. The share agreement can differ from boat to boat. Some fishermen receive a share of the profits, while others receive a share of the gross earnings of the boat. This traditional payment method produces strong economic incentives for maximizing catches and minimizing costs.

Repair and maintenance costs can change substantially from one year to the next. In a particularly bad year these expenses could account for 20 percent of variable costs (PSMFC 2003). Protection and Indemnity insurance accounts for approximately 5 percent of variable costs. Unlike hull insurance, which most operators treat as a fixed cost, Protection and Indemnity insurance is a variable cost. Its price is primarily dependent on three factors: expected numbers of days at sea, number of crew, and the loss history of the vessel or company (PSMFC 2003). Food and consumables make up about 2 percent of an at-sea operation's total variable costs. This category includes food as well as galley supplies, cleaning products, linens, miscellaneous hardware, etc.(PSMFC 2003).

Major operating expenses for fish-processing facilities include raw fish, labor, fuel, shipping, utilities, permits, and packaging supplies. Shipping costs account for approximately 12 to 15 percent of variable costs (PSMFC 2003). The majority of fish products are shipped via commercial carriers to intermediate or final destinations. Wage rates vary from one plant to another and among locations. While some floating processors pay minimum wage ($7.15 per hour), the average pay, when room and board is not provided, is about $7.50 per hour (Alaska Department of Labor and Workforce Development 2003). A few plants operate for only a short five-to-six week season and may pay $8 or $9 an hour. In addition to the expense items listed above, some processing facilities also purchase food additives. For example, pollock surimi additives such as sorbital, sugar and phosphates account for about 5 percent of the variable costs (PSMFC 2003).

Other significant operating costs for certain shore-based processors and fishing vessels are those associated with deployment of observers.[8] The fishing industry must bear these costs, which are about $355 per deployment day, not including food costs.

In addition to variable costs, the owners of fishing vessels and processing facilities must meet fixed costs, i.e., expenses that do not vary with level of production, such as the interest on the debt incurred in purchasing a boat, processing facility, license, or other fishing- or processing-related assets.

At present, there is insufficient data on operating costs to comprehensively assess economic conditions in the groundfish fisheries. The types of economic data that would be necessary include disaggregated cost and

[8] With some exceptions, observer regulations require vessels 125 ft or longer to carry an observer 100 percent of the time while fishing for groundfish; vessels 60-124 ft long to carry an observer during 30 percent of their fishing days in each calendar quarter of the year in which they fish more than 10 days; plants processing 1,000 or more metric tons in a month to have an observer in the plant each day they process groundfish; and those processing 500-1,000 mt to have observers 30 percent of the days.

employment information from harvesting and processing firms. No data on the costs of production and little data on employment levels are routinely collected.[9] Without information about costs, it is not possible to determine the profitability of harvesting and processing operations.

NOAA Fisheries and NPFMC have recognized the increasing need to collect economic data on a regular basis. To help meet this need, the Fisheries Economics Data Program was established as a cooperative data collection program by NOAA Fisheries and the Pacific States Marine Fisheries Commission with the assistance of NPFMC and Pacific Fishery Management Council. On-going economic data collection efforts by the program include a monthly survey of fuel docks at selected ports on the West Coast and in Alaska to create a marine fuel price index. Data are currently available for the period 1999-2002.

Safety of Human Life at Sea. The high risks faced by fishermen at sea and the effects of fishery regulations on those risks are recognized broadly. The MSA National Standard 10 highlights the issue of fishing vessel safety, stating that conservation and management measures must, to the extent practicable, promote the safety of human life at sea. The harsh sea and weather conditions in the Bering Sea and GOA make fishing in Alaska one of the most dangerous occupations in the U.S. (Barrett 2000). However, the safety record of fishing vessels in Alaska fisheries improved substantially after implementation of the Commercial Fishing Industry Vessel Safety Act (CFIVSA) in 1988 (van Amerongen 2002). The law required the U.S. Coast Guard to issue new regulations for safety equipment and operating procedures for fishing, fish tender and fish processing vessels. It also increased casualty reporting requirements. As a result of this legislation, vessels are better equipped with Emergency Position Indicating Radio Beacons, life rafts, side-band radios, and survival suits. Moreover, emergency drill instructor training and mandatory monthly drills are required of all fishing vessels. Following the passage of the CFIVSA, vessels throughout Alaska have had the opportunity to obtain a voluntary dockside examination by the Coast Guard or Coast Guard Auxiliary (Medlicott 2002). If they pass the inspection they are issued a Vessel Safety Inspection Decal, valid for two years. Since a voluntary dockside examination is currently voluntary, NPFMC initiated a regulation in 1998 that made the voluntary dockside examination or some other documentation of compliance with Coast Guard regulations mandatory for all vessels carrying observers (Cullenberg 2002).

The CFIVSA and other safety initiatives helped reduce the loss of life from commercial fishing by almost 50 percent (from losing an average of 34 persons annually in Alaska in the 1980s to 16 in the 1990s) (Barrett 2000). With an average fatality rate of approximately 28 fatalities per 100,000 FTE workers since 1990, the BSAI pollock fishery has enjoyed a relatively solid safety record for the past decade (Woodley 2002). Nevertheless, 536 individuals suffered severe injuries in commercial fishing-related incidents in Alaska during 1991-1997 (Lincoln *et al.* 2002), and 120 Alaska fishermen died between 1989 and 1999 (Cullenberg 2002). Over 90 percent of deaths in Alaska's commercial fishing industry were due to drowning, following vessel sinkings (Lincoln *et al.* 2002).

In response to a surge in commercial fishing-related deaths and vessel losses in 1999 (17 Alaska fishermen lost their lives in that year), the Seventeenth Coast Guard District increased the focus on commercial fishing vessel safety. One of the items developed was the "Ready for Sea" program (Page 2002). This is a list of the top ten safety items to which mariners should pay particular attention in order to mitigate known risks and

[9] Most fishermen are considered self-employed and as a result are not included in Alaska Department of Labor and Workforce Development employment statistics.

help ensure a vessel's safe return to port. The checklist focuses on items that could prevent an incident and how to be prepared to respond if one does occur.

The Coast Guard receives support for maintaining fishing vessel safety from the North Pacific Fishing Vessel Owners' Association (NPFVOA), a non-profit, membership based organization. The NPFVOA and Coast Guard produced the Vessel Safety Manual in 1985 and collaborated on a core safety program and set of safety training videos. The core program consists of survival at sea training, first aid and CPR training, fire fighting, and stability training and the Safety at Sea video series includes four videos titled Safety Equipment and Survival Procedures, Fire Prevention and Control, Medical Emergencies at Sea, and Fishing Vessel Stability. After the passage of the CFIVSA, the NPFVOA developed a course to teach individuals how to conduct emergency drills. Since it was first organized, the NPFVOA has trained over 22,000 fishermen.

The IFQ program for the halibut and sablefish longline fishery and the establishment of cooperatives in the BSAI pollock fishery under the AFA have contributed to the improved safety record in the Alaska groundfish fisheries by slowing the pace of fishing. For example, the elimination of the race for fish in these fisheries provide captains with the opportunity to wait out a storm without negative economic consequences (van Amerongen 2002). A 1995 report from Marine Safety Reserve, a liability pool, noted a substantial decline in the longline vessel accident rate (injuries per fishing day) following implementation of the IFQ program (Buck 1995). Safety statistics compiled by the U.S. Coast Guard show that, as the IFQ program progressed, a substantial drop in search and rescue missions for the sablefish and halibut fisheries occurred (Hartley and Fina 2001b, Woodley 2002). Furthermore, a survey of sablefish fishermen revealed that more than 90 percent reported weather as an important factor in determining when to fish quota (Knapp and Hull 1996). Similar benefits in vessel safety have resulted from the operation of the AFA pollock cooperatives. While the slowing down of the BSAI pollock fishery and the flexibility offered by the quota systems has not had an impact upon fatality rates (the fatality rate has remained at zero since 1995), vessel owners from several of the Pollock Conservation Cooperative companies have reported an approximately 50 percent reduction in processing-crew injuries (Woodley 2002).

Catcher Vessels

This section provides brief profiles of the nine classes of groundfish catcher vessels that participate in the groundfish fisheries off Alaska. As is the case with the profiles of the offshore and inshore processors that follow, the information on catcher vessels provided here is an abridged version of the detailed profiles in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2001). Each catcher vessel profile reports generally the same types of information to ease comparisons among classes. The remainder of this introductory section describes the features that distinguish the various classes from each other and provides an overview of the catcher vessel activities from 1992-2001.

Catcher vessels harvest groundfish by using various gear types and deliver their catch to inshore processing plants or motherships. Catcher vessels can be divided into two general categories: trawl vessels and fixed gear vessels. This analysis creates five classes of trawl vessels based on participation patterns and vessel length. Four classes of fixed gear vessels are defined based on primary gears and vessel length. Each vessel with participation in the groundfish fisheries above threshold levels was assigned to one of these classes during a given year according to its fishing activities in that year and its size. The classes were developed specifically

for use in this analysis to enhance the differences and similarities among the catcher vessels that participate in the groundfish fisheries.

Catcher vessels harvest a number of species, including both groundfish and non-groundfish. In an effort to provide a relatively uniform description of the activities of each of the nine types of catcher vessels and to report as much catch data as possible under NOAA Fisheries data confidentiality restrictions, this analysis aggregated the groundfish species into the four main groups (A-R-S-O, FLAT, PCOD and POLL) presented in Table 3.9-2. Further, catcher vessels operate in different regions of Alaska, and their owners and crew reside in communities located in or out of the state. The geographic regions that were identified for this analysis are presented in Table 3.9-3.

Table 3.9-6 summarizes the operations of the nine catcher vessel classes in 2001. The table also provides a comparison of the relative level of activities of the different classes.

The vessels in the first two TCV classes (TCV BSP ≥ 125 and TCV BSP 60-124) are all eligible to harvest the directed fishing allowance under Section (b)(1) of the American Fisheries Act and focus almost exclusively on Bering Sea pollock. The two classes differ in that the larger vessels can carry significantly more fish in their holds and are able to fish much farther from shore. In 2001, these two classes of catcher vessels accounted for more than half of the total catcher vessel ex-vessel value and payments to labor.

The third class of TCV (TCV Division-AFA) are also AFA-eligible, but they generate less gross revenue in the BSAI pollock fisheries than they do in other trawl fisheries, such as those occurring in the GOA. This class generally consisted of vessels between 60 and 124 ft in LOA, but in some years included one or two vessels longer than 124 ft. The fourth class of TCV (TCV Non-AFA) are not AFA-eligible and therefore do not have access to the lucrative BSAI pollock fisheries. Instead, these vessels focus their fishing effort in the GOA. These vessels are all greater than 60 ft long. The final class of trawl vessels (TCV < 60) are all less than 60 ft in length and fish almost exclusively in the GOA. Most of these vessels also participate in Alaska salmon fisheries with purse seine gear. State regulations prohibit the use of vessels longer than 58 ft in salmon seine fisheries.

Pot catcher vessels (PCVs) traditionally have focused on crab fisheries. Recently, these vessels have developed a secondary source of income between crab fishing seasons by using pot fishing techniques to harvest Pacific cod. Longline catcher vessels (LCVs) concentrate their fishing effort in sablefish and halibut IFQ fisheries. Although the groundfish harvests of LCVs are substantially less than those of TCV, the value of their harvests are significant because of the relatively high ex-vessel value of sablefish. All vessels in the PCV and LCV classes are 60 ft or longer.

There are far more vessels in the class comprised of fixed gear catcher vessels from 33 to 59 ft in length (Fixed Gear Catch Vessels 33-59) than in any other class. Most of these vessels participate in groundfish fisheries to augment their earnings from Alaska salmon fisheries. However, because this class is so large it has the third highest ex-vessel value of groundfish among the catcher vessel classes. These vessels obtain most of their groundfish revenues from harvests of Pacific cod and high-value species in the A-R-S-O group, primarily sablefish and rockfish.

Fixed gear catcher vessels (FGCV) less than or equal to 32 ft in length (FGCV ≤ 32) have limited activity in groundfish fisheries, as most of these vessels were constructed specifically to harvest salmon. They often harvest higher-value groundfish such as Pacific cod, rockfish and sablefish when not engaged in salmon fisheries. Vessel size restricts the effectiveness of the FGCV ≤ 32 class in groundfish fisheries.

Overview of Catcher Vessel Activities

Table 3.9-7 summarizes the activities of catcher vessels in the Alaska groundfish fisheries during the 1992-2001 period. Major findings presented in the table are as follows:

- The number of catcher vessels in the groundfish fisheries declined from 1,374 in 1992 to 917 in 2001. However, the quantity of groundfish landed by catcher vessels and retained by processors remained relatively steady, fluctuating between a high of 970 thousand mt in 1997 and a low of 772 thousand mt in 1993. The harvest was stable in comparison to the number of participating vessels because most of the vessels that exited the fisheries were small fixed gear vessels (FGCV 33-59 and FGCV ≤ 32) that tend to harvest less fish. Furthermore, total groundfish catch depends less on the number of vessels than on the allowable harvest levels and allocations among fishery participants established by NOAA Fisheries and NPFMC.

- During the 1992-2001 period most of the catcher vessels were owned by residents of the Southcentral Alaska and Southeast Alaska Regions. However, the number of vessel owners from these regions decreased, while the number of vessel owners from the WAIW Region increased.

- In some years non-groundfish species were nearly as important as groundfish to catcher vessels as a whole in terms of ex-vessel value. Between 1992 and 2000, non-groundfish accounted for about half of the ex-vessel value of the landings of all catcher vessels.

- As a result of the high ex-vessel value of Pacific cod and species in the A-R-S-O complex, which includes sablefish and rockfish, the ex-vessel value of landings of these species approached or exceeded that of pollock in some years. In 1996, for example, pollock accounted for 47 percent of total ex-vessel value of groundfish landings, while the A-R-S-O group and Pacific cod accounted for 29 and 22 percent, respectively. However, pollock has accounted for most of the ex-vessel value of catcher vessels in recent years.

- Between 1992 and 2001, the BSAI accounted for 51 to 63 percent of the ex-vessel value of catcher vessel landings. It is in this area that large trawlers harvest pollock. The GOA is a major source of Pacific cod and A-R-S-O species.

- In 2001, the WAIW Region accounted for about 40 percent of the total FTE groundfish employment on catcher vessels and approximately 60 percent of the total payments to labor. The difference is due to fact that most of the boats and employment came from smaller, Alaska-based vessels with generally lower groundfish revenues, while the larger vessels with higher groundfish revenues per crew were mainly based in Washington.

Drawing on information in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2001), the remainder of this subsection presents summary profiles of the nine catcher vessel classes. Each catcher vessel class profile provides a description of the class in terms of the size and number of vessels; an overview of participation by the class in groundfish and other Alaska fisheries; a more detailed look at the Alaska groundfish fisheries important to the class; estimates of employment and payments to labor in the Alaska groundfish fisheries; and patterns of vessel ownership.[10] Each profile also includes a table showing number of active vessels, vessel ownership, groundfish landings retained, ex-vessel value of groundfish and non-groundfish retained, ex-vessel value of groundfish retained by species group, ex-vessel value of groundfish retained by FMP subarea, and groundfish employment and payments to labor by region.

Bering Sea Pollock Trawl Catcher Vessels ≥ 125 ft in Length (TCV BSP ≥ 125)

Synopsis. Large vessels that are AFA-eligible and rely almost exclusively on pollock harvested in the Bering Sea. Nearly all of the catch of these vessels is delivered to Bering Sea pollock shoreplants (Bering Sea pollock-shoreplants) (Table 3.9-8).

Description of the Class. This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea pollock catch is greater than the value of the catch of all other species combined, vessel length is greater than or equal to 125 ft, and the total value of groundfish catch is greater than $5,000. All of these vessels fishing after 1998 are AFA-eligible. In 2000, vessels in the TCV BSP ≥ 125 class had an average length of 153 ft, an average horsepower rating of about 2,475, an average gross tonnage of approximately 310 tons, and an average hold capacity of 13,500 cubic ft.

Participation in Groundfish Fisheries. The number of vessels in this class reached a peak of 36 in 1997. In 1999, the most recent year for which landings data for all non-groundfish species are available, about 93 percent of all ex-vessel value generated by the class came from groundfish fisheries. Some of these vessels also participate in the summer Pacific whiting fishery off the coasts of Oregon and Washington. During June and July, some vessels in this category may tender salmon or undergo maintenance if they are not engaged in the whiting fishery. The bimodal distribution of groundfish activity of this vessel class is a function of the two primary regulatory seasons for pollock—the roe season in the winter and spring and the non-roe season in the summer and fall. Because of the class's reliance on the pollock resource, the Bering Sea FMP subarea is clearly the most important fishing area. In recent years this area accounted for more than 98 percent of the total ex-vessel value of the groundfish landed by this vessel class. Nearly all of the groundfish was delivered to Bering Sea pollock-shoreplants.

Groundfish Landings by Species. Pollock is clearly the most important fishery for the class, accounting for nearly all of the retained groundfish landings and ex-vessel value. Pacific cod has been the second most important species in terms of volume and value since 1988. From 1992 to 2001, the volume of groundfish

[10] While it is known that many of the large inshore processing plants have full or part ownership of many of the catcher vessels that deliver to them, detailed information regarding ownership linkages within the fishing industry is absent. Vessel registration and permit information do not necessarily reveal the true ownership of vessels. Consequently, this analysis did not attempt to provide a detailed description of vessel ownership patterns.

retained for the class varied between 206 thousand mt and 383 thousand mt. In the same period, groundfish ex-vessel value ranged from a high of $100 million in 1997 to a low of $35 million in 1993.[11]

Employment, Payments to Labor, and Ownership. Normally, a vessel in the TCV BSP ≥ 125 class carries four to five crewmembers (including the skipper) when fishing for pollock and other groundfish. In addition to the fishing crew, one or more people must be responsible for accounting, correspondence, record keeping, and other business requirements. The vessel owner may fill this role or hire a person or firm to complete these tasks. Payments to labor for this vessel class have varied widely as a result of fluctuations in ex-vessel value. In 2001, Washington residents owned all vessels in this class except one. The one exception was owned by a resident of the Other Regions.

Bering Sea Pollock Trawl Catcher Vessels 60 to 124 ft in Length (TCV BSP 60-124)

Synopsis. These are large- or medium-sized vessels that are AFA-eligible and rely almost exclusively on pollock harvested in the Bering Sea. Many of the vessels deliver their catch to motherships or catcher processors (Table 3.9-9).

Description of the Class. This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea pollock catch is greater than the value of the catch of all other species combined, vessel length is 60 ft to 124 ft, and the total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.

Vessels in this class are similar to vessels in the TCV BSP ≥ 125 class. The key difference between the two classes is vessel size. Because of their relatively small fish-hold sizes, many of the vessels in this class cannot carry enough pollock to be cost-effective in the high-volume, shore-based pollock fishery. Therefore, many vessels deliver their pollock to motherships or to catcher processors. In 2000, over 42 percent of the total value of deliveries in the TCV BSP 60-124 class was generated by at-sea deliveries. In that year vessels in the TCV BSP 60-124 class had an average length of 113 ft, an average horsepower rating of about 1,330, and an average hold capacity of 7,763 cubic ft.

Participation in Groundfish Fisheries. The number of vessels in this class has fluctuated, reaching a peak of 63 in 1995 and declining to a low of 42 in 1999. The vessels in this class focus their fishing effort in the BSAI pollock fishery. The primary pollock fishing periods extend from mid-January through the end of April and from August through November, with variations due to regulatory changes. Some of these vessels also participate in the summer Pacific whiting fishery off the coasts of Oregon and Washington. During June and July, some vessels in this category may tender salmon or undergo maintenance if they are not engaged in the whiting fishery. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 88 percent of all ex-vessel value generated by the class came from groundfish fisheries. Because of reliance on pollock, the Bering Sea FMP subarea is the most important fishing area for the class and accounted for about 97 percent of the total ex-vessel value of groundfish retained in 2001. In 2000,

[11] After the enactment of the American Fisheries Act in 1998, ex-vessel prices may have been more closely tied to the quality of fish delivered, particularly for roe-bearing pollock harvested in the A season. Higher A season prices were noted in payments to TCV from motherships.

roughly 56 percent of the ex-vessel value was generated from deliveries to Bering Sea pollock-shoreplants, while motherships accounted for 40 percent of the class's groundfish revenues.

Groundfish Landings by Species. In 2000, pollock accounted for 94 percent of harvest volume and 87 percent of total ex-vessel value. From 1992 to 2001, the volume of groundfish retained for the class varied between 254 thousand mt and 424 thousand mt. In the same period, groundfish ex-vessel value ranged from a high of $95 million in 1992 to a low of $43 million in 1998.

Employment, Payments to Labor, and Ownership. Four- to five-person crews, including the skipper, are typical on vessels in the TCV BSP 60-124 class, although it is likely that the AFA will result in a reduction in crew size for some vessels. Since 1992, the estimated FTE groundfish employment for this class has fluctuated widely, from a low of 128 in 1999 to a high of 290 in 2001. Estimated payments to labor have also varied widely as a result of fluctuations in ex-vessel value. In 2001, vessel owners from WAIW accounted for about two-thirds of the vessels in this class, and Oregon residents owned about 22 percent of the fleet. In recent years, a few vessels have been owned by residents of Kodiak.

Diversified AFA-Eligible Trawl Catcher Vessels Greater than or Equal to 60 ft in Length (TCV Div. AFA)

Synopsis. These are medium-sized vessels that are AFA-eligible but participate in the GOA pollock fishery and BSAI and GOA Pacific cod fisheries as well as the Bering Sea pollock fishery (Table 3.9-10).

Description of the Class. This catcher vessel class includes all vessels that are AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea pollock catch is less than value of catch of all other species combined, vessel length is equal to or greater than 60 ft, and the total value of groundfish catch is greater than $5,000.

Vessels in the TCV Div. AFA class are more diversified in fishing effort than vessels in the TCV BSP ≥ 125 and TCV BSP 60-124 classes, but they are also eligible under AFA to participate in the BSAI pollock fisheries. In 2000, vessels in the TCV Div. AFA class had an average length of 92 ft, an average horsepower rating of about 995, an average gross tonnage of approximately 170 tons, and an average hold capacity of 4,866 cubic ft.

Participation in Groundfish Fisheries. The number of vessels in this class varied between 19 and 34 during the 1992-2001 period. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 93 percent of all ex-vessel value generated by the class came from groundfish fisheries. In addition to Bering Sea pollock, vessels in the TCV Div. AFA class have significant participation in the GOA pollock fisheries and the Pacific cod fisheries in both the BSAI and GOA. Some vessels in the class also participate in the Pacific whiting fishery off the coasts of Oregon and Washington. In recent years, GOA fisheries were more important for this class than BSAI fisheries in terms of ex-vessel value of groundfish retained. In 2000, roughly 46 percent of the ex-vessel value was generated from deliveries to Kodiak shoreplants, while 36 percent of the ex-vessel value was from Bering Sea processing facilities.

Groundfish Landings by Species. Pollock is the single most important species for the TCV Div. AFA class in terms of harvest volume and ex-vessel value. Pacific cod is the second most important species. Overall, ex-vessel value peaked in 1992 as the groundfish fisheries changed from joint venture fisheries to domestic

processing operations. In 1993, gross revenues dropped significantly due primarily to lower ex-vessel prices rather than smaller harvests. From 1992 to 2001, the volume of groundfish retained for the class varied between 48 thousand mt and 111 thousand mt. In the same period, ex-vessel value ranged from a high of $33 million in 1992 to a low of $12 million in 1996.

Employment, Payments to Labor, and Ownership. Four person crews, including the skipper, are typical on vessels in the TCV Div. AFA class. Payments to labor have varied widely as a result of fluctuations in ex-vessel value. In 2001, vessel owners from Washington accounted for 45 percent of the vessels in this class, while residents of Oregon accounted for 20 percent of the vessels. The percentage of vessels owned by Kodiak residents has declined over the years, but residents of this region still accounted for one-fifth of the fleet in 2001.

Non-AFA Trawl Catcher Vessels Greater than or Equal to 60 ft in Length (TCV Non-AFA)

Synopsis. These are medium-sized vessels that participate in the GOA groundfish fisheries and may also participate in halibut IFQ fisheries using longline gear (Table 3.9-11).

Description of the Class. This class includes all vessels that are not AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea pollock catch is less than the value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and the total value of groundfish catch is greater than $5,000. In 2000, vessels in the TCV Non-AFA class had an average length of 83 ft, an average horsepower rating of about 660, an average gross tonnage of approximately 140 tons, and an average hold capacity of 3,550 cubic ft.

Participation in Groundfish Fisheries. Participation peaked at 48 vessels in 1992, and then dropped back to a more stable level between 32 and 40 vessels. The annual cycle of operations of vessels in the TCV Non-AFA class differs from that of AFA-eligible TCVs. Differences include the reliance of the TCV Non-AFA fleet on the GOA groundfish fishery and the participation of several vessels in this class in the halibut IFQ fisheries using longline gear. Because these vessels are longer than 60 ft, they are ineligible to participate in Alaska commercial salmon fisheries with seine gear. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 84 percent of all ex-vessel value generated by the class came from groundfish fisheries. The central GOA has been the most important FMP subarea for the class. The importance of the Bering Sea peaked in 1997. After that year, vessels in the TCV Non-AFA class were unable to fish for BSAI pollock as a result of enactment of the AFA. However, the non-pollock harvest restrictions on AFA trawl vessels may encourage non-AFA trawl vessels to increase their participation in the BSAI Pacific cod fishery. In 2000, deliveries to Kodiak shoreplants accounted for 74 percent of gross revenues, while deliveries to Alaska Peninsula and Aleutian Islands shoreplants accounted for 11 percent.

Groundfish Landings by Species. As with AFA eligible TCVs, pollock is the primary species in terms of retained tonnage for vessels in the TCV Non-AFA class. However, the ex-vessel value of Pacific cod exceeded that of pollock in every year except 1998 and 2001. From 1992 to 2001, the volume of groundfish retained for the class varied between 33,000 and 55,000 mt. In the same period, ex-vessel value ranged from a high of $22 million in 1997 to a low of $9 million in 1994.

Employment, Payments to Labor, and Ownership. Vessels in the TCV Non-AFA class typically carry a crew of four, including the skipper. One crewmember usually functions as the engineer in addition to filling a position on deck. One person may function as the cook, or that role may be shared among crewmembers. Payments to labor have varied widely as a result of fluctuations in ex-vessel value. A fairly stable ownership pattern by Alaska residents is evident for vessels in this class. Between 11 and 15 of the vessels were registered to residents of Kodiak between 1992 and 2001. Other Alaska residents were the registered owners of another three to eight vessels. Residents of Washington and Oregon owned most of the remaining vessels.

Trawl Catcher Vessels Less than 60 ft in Length (TCV < 60)

Synopsis. These are small trawlers that participate in the GOA groundfish fisheries and may also participate in salmon fisheries using purse seine gear (Table 3.9-12).

Description of the Class. This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, vessel length is less than 60 ft, and the total value of groundfish catch is greater than $2,500. The TCV < 60 fleet is treated as a distinct class because of differences between these vessels and larger TCVs. In particular, vessels in the TCV < 60 class are allowed to participate in the State of Alaska commercial seine fisheries for salmon. Alaska's limited entry program for salmon fisheries established a 58-foot length limit for seine vessels entering these fisheries after 1976. Many TCVs less than 60 ft in length were built to be salmon purse seine vessels, while others were designed to function as both trawlers and seiners.

Vessels in the TCV < 60 class are distinct from fixed gear vessels greater than 32 ft and less than 60 ft because of their ability and propensity to use trawl gear. Vessels in the TCV < 60 class have larger engines, more electronics, larger fish holds, and the necessary deck gear and nets to operate in the trawl fisheries. Similar-sized fixed gear vessels that participate in commercial salmon fisheries with purse seine gear have not made the necessary investment to participate in the trawl fisheries.

Participation in Groundfish Fisheries. The number of vessels in this class increased steadily from 1989 through 1993. This increase coincided with the development of domestic shore-based fisheries in the western GOA and central GOA FMP subareas of the GOA, where most of these vessels participate. From 1994 through 2001, the number of vessels in the TCV < 60 class remained between 44 and 61. Vessels in the TCV < 60 class participate in multiple fisheries and generally take full advantage of locally available fishery resources. These resources can differ significantly across different fishery management areas. Salmon harvesting is important to the economic viability of most vessels in this class. A significant percentage of the vessels also participate in the sablefish and halibut longline IFQ fisheries. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 55 percent of all ex-vessel value generated by the class came from groundfish fisheries. The decline in non-groundfish revenues after 1995 was primarily the result of a drop in salmon landings. The western GOA and central GOA are by far the most important fishing areas for the class, accounting for about 90 percent of the ex-vessel value in 2001. Vessels in the TCV < 60 class are increasingly relying on Alaska Peninsula and Aleutian Islands shoreplants for deliveries. In 2000, they received 82 percent of their gross revenues from these plants, up from 70 percent in 1998. Processors in Kodiak are becoming less important to the TCV < 60 class, accounting for 34 percent of the ex-vessel value in 1995 and 6 percent in 2000.

Groundfish Landings by Species. Vessels in the TCV < 60 class focus their effort on Pacific cod in the western GOA and central GOA FMP areas of the GOA. Pollock is also an important trawl species, while sablefish (a component of the A-R-S-O species aggregation) harvested with longline gear makes a substantial contribution to the gross revenues of the class. From 1992 to 2001, the volume of groundfish retained for the class varied between 19,800 and 39,800 mt. In the same period, ex-vessel value ranged from a high of $14 million in 1997 to a low of $7 million in 1993.

Employment, Payments to Labor, and Ownership. The crew size on vessels in the TCV < 60 class typically ranges from three to four, including the skipper, depending on the fishery. Usually these crewmembers are employed in other fisheries as well. Since 1992, total estimated groundfish employment in the TCV < 60 class has varied between 91 and 129. About 75 percent of the vessels were owned by Alaska residents in 2001, and the remainder were owned predominantly by residents of Washington. Alaska Peninsula and Aleutian Islands has consistently been the region with the highest number of vessel owners in this class during the past decade, with most current owners residing in King Cove and Sand Point.

Pot Catcher Vessels

Synopsis. These are medium-sized vessels that rely mostly on crab fisheries but also participate in Pacific cod fisheries primarily in the Bering Sea and central GOA (Table 3.9-13).

Description of the Class. This catcher vessel class includes all vessels that are not TCVs for which the value of pot catch is greater than15 percent of total catch value, vessel length is greater than or equal to 60 ft, and the total value of groundfish catch is greater than $5000. The vast majority of vessels in this class focus on crab fisheries and participate in groundfish fisheries only as a secondary activity. This class is distinct from other fixed gear vessels because all vessels in the class have crab endorsements under NPFMC BSAI Crab LLP, primarily use pots rather than longline or jig gear, and are longer than 60 ft. These differences in vessel size, gear type, and relevant regulations result in operational and financial differences between PCVs and other fixed gear catcher vessels. However, many PCVs have substantial landings with longline gear. In 2000, vessels in the PCV class had an average length of 105 ft, an average horsepower rating of about 825, an average gross tonnage of approximately 185 tons, and an average hold capacity of 7,475 cubic ft

Participation in Groundfish Fisheries. The number of PCVs that have made more than incidental landings of groundfish varied widely between 1992 and 2001. During the early part of this period, many vessels experimenting with pot fishing for Pacific cod could not make enough money to justify continued participation. In 1995, harvests in the opilio tanner crab fishery, which had become the mainstay of the crab fleet, reached the lowest levels in a decade, and crab fishers sought other fisheries to generate needed revenues. The number of PCVs with substantial groundfish landings jumped to 101. Between 1995 and 2000, participation first declined as opilio harvests increased but then sharply increased to 158. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 13 percent of all ex-vessel value generated by the class came from groundfish fisheries. The crab fishery is the mainstay of the PCV class. The Pacific cod fishery is a way to keep crewmembers employed for longer periods and possibly make additional marginal contributions to the financial bottom line. The Bering Sea FMP subarea is the most important fishing area for the PCV class, followed by the central GOA. Bering Sea shoreplants are the largest buyers of groundfish harvests of PCVs, accounting for approximately 40 percent of gross revenues. Processors in Kodiak account for about 30 percent of PCV ex-vessel value.

Groundfish Landings by Species. Pacific cod has been the most important groundfish species for this class in terms of harvest volume and total ex-vessel value, and pollock has been the least important groundfish species. The A-R-S-O aggregation also accounts for a relatively large share of ex-vessel value, reflecting the fact that between 10 and 17 vessels in this class have participated in the high-value sablefish fisheries over the years. From 1992 to 2001, the volume of groundfish retained for the class varied between 7,000 and 27,000 mt. In the same period, ex-vessel value ranged from a high of $21 million in 2000 to a low of $4 million in 1993.

Employment, Payments to Labor, and Ownership. Pot vessels harvesting groundfish have an average of four to five crewmembers, including the skipper. Since 1992, total estimated FTE groundfish employment in the PCV class has varied between 72 in 1993 to 329 in 2000. During the 1992-2001 period, about half of the vessels in this category were owned by Alaska residents, on average. However, in recent years the percentage of vessels owned by Washington residents has substantially increased. Among the regions in Alaska, Kodiak has generally had the most vessel owners in this class.

Longline Catcher Vessels Greater than or Equal to 60 ft in Length

Synopsis. These are medium-sized vessels that target halibut and higher-priced groundfish such as sablefish and rockfish mainly in the eastern and central GOA (Table 3.9-14).

Description of the Class. This catcher vessel class includes all vessels that are not TCVs or pot catcher vessels for which vessel length is greater than or equal to 60 ft and the total value of groundfish catch is greater than $2,000, excluding halibut and state water sablefish. A large majority of the vessels in this class operate solely with longline fixed gear, focusing on halibut and relatively high-value groundfish such as sablefish and rockfish. Their operating parameters are influenced primarily by regulations for fixed gear fisheries targeting these species. The reliance of LCVs on groundfish fisheries sets them apart from smaller fixed gear catcher vessels, which are much more likely to operate in Alaska salmon fisheries with multiple gear types. The use of 60 ft as the minimum length for vessels in this class reflects the fact that regulations for State of Alaska salmon fisheries limit participating vessels to 58 ft. Thus, by definition vessels in the LCV class are generally precluded from operating in Alaska salmon fisheries. The LCVs reliance on longline gear sets them apart from the other large fixed gear vessels that use pots and have crab endorsements under the Crab LLP. In 2000, vessels in the LCV class had an average length of 72 ft, an average horsepower rating of about 395, an average gross tonnage of approximately 90 tons, and an average hold capacity of 4,688 cubic ft.

Participation in Groundfish Fisheries. The number of longline catcher vessels increased from 89 in 1988 to 121 in 1994. The general decline in the number of vessels in this class since 1994 may be the outcome of the IFQ program. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 34 percent of all ex-vessel value generated by the class came from groundfish fisheries. The eastern GOA and central GOA FMP subareas are the most important fishing areas for the LCV class. In 2000, LCVs received 37 percent of their gross revenues from processors in Southcentral Alaska and 31 percent from processors in Southeast Alaska. The relative importance of processors in Kodiak increased from 10 percent of the ex-vessel value in 1999 to 19 percent in 2000.

Groundfish Landings by Species. A-R-S-O were the most often landed groundfish species for the LCV class during the 1992-2001 period, whereas pollock was the least. From 1992 to 2001, the volume of groundfish

retained for the class varied between 4,200 and 18,400 mt. In the same period, ex-vessel value ranged from a high of $39 million in 1997 to a low of $8 million in 1993. Low prices in 1998 and 1999, due to primarily the Asian economic crisis, had a major negative impact on gross revenues.

Employment, Payments to Labor, and Ownership. The LCV class is one of the most labor-intensive of the groundfish catcher vessel classes due to the need to handle each fish and piece of fishing gear individually. LCVs typically carry between three and six deckhands and a skipper who also works the deck, although the number of crewmembers has decreased since 1995 with implementation of the IFQ system. The actual number of deckhands on LCVs generally depends on the fishery and the experience and productivity of the captain and crew. Total estimated FTE employment in groundfish fisheries in the LCV class declined from its high in 1995 (215 FTE) to 169 FTE in 2000. Labor payments per FTE position varied considerably over the 1992-2001 period. Prior to implementation of IFQs in 1995, FTE labor payments were relatively low, but they increased to a peak at $79,213 in 1997. In 1998 and 1999, payments declined due primarily to low prices resulting from the Asian economic crisis. In 2001, about half of the vessels in this category were owned by Alaska residents, and the remainder were owned mainly by Washington residents. Southeast and Southcentral Alaska have had the largest number of vessel owners among the Alaska regions since the late 1980s. The number of owners in Southeast Alaska has been stable over the years compared to the number of owners from other Alaska regions. The percentage of owners in Southcentral Alaska declined from 27 in 1994 (the year before IFQs) to 9 in 1999. Post-IFQ changes in other regions do not appear to be as significant.

Fixed Gear Catcher Vessels Greater than 32 and Less than 60 ft in Length (FGCV 33-59)

Synopsis. These are small vessels that focus on salmon, halibut, and higher-priced groundfish using a mix of gear types mainly in the eastern and central GOA (Table 3.9-15).

Description of the Class. This catcher vessel class includes all vessels that are not TCVs for which vessel length is 33 to 59 ft, and the total value of groundfish catch is greater than $2000. The larger size of these vessels in comparison to vessels in the smaller fixed gear class results in greater capacity and fishing efficiency. Consequently, this class accounts for a large portion of the total harvest of fixed gear vessels. The vessels in this class employ a mix of gear types, with smaller vessels typically using longline and jig gear, and larger vessels typically employing longline and pot gear. This class was established because these vessels were typically designed for, and participate in, a greater number of fisheries than smaller fixed gear vessels do, and vessels in this class use more gear types than larger fixed gear vessels use. The length of these vessels (< 60 ft) also means they can participate in almost all Alaskan salmon fisheries with the notable exception of fisheries in Bristol Bay. In 2000, vessels in the FGCV 33-59 class had an average length of 47 ft, an average horsepower rating of about 313, an average gross tonnage of approximately 36 tons, and an average hold capacity of 2,395 cubic ft.

Participation in Groundfish Fisheries. From 1994 through 2001, the number of vessels in the FGCV 33-59 class fluctuated between 514 and 860. The significant decline in vessel numbers after 1994 is assumed to be a result of the implementation of IFQs in sablefish and halibut fisheries. The activities of this vessel class have focused on salmon, halibut, and groundfish. Groundfish harvests decline significantly when these vessels switch to harvesting salmon and halibut. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 29 percent of all ex-vessel value generated by the class came from groundfish fisheries. From 1992 to 2001, the eastern GOA and central GOA FMP subareas accounted for

almost all of the value of groundfish retained by this class. Processors in Southeast Alaska accounted for approximately 45 percent of the ex-vessel value generated by the FGCV 33-59 class. Processors in Kodiak and Southcentral Alaska both contributed about 20 percent of the total ex-vessel value of the class. The relative importance of Kodiak processors increased following implementation of IFQs in 1995.

Groundfish Landings by Species. Landing volumes were significantly greater for A-R-S-O than for the other species during the entire 1992-2001 period, and pollock and flatfish had the lowest landings. High-value sablefish has been the most important species. Pacific cod has been the second most important species in terms of volume, but is a much smaller component in terms of ex-vessel value. From 1992 to 2001, the volume of groundfish retained for the class varied between 15,000 and 27,000 mt. In the same period, ex-vessel value ranged from a high of $48 million in 2000 to a low of $30 million in 1998.

Employment, Payments to Labor, and Ownership. This analysis assumed an average crew size of 3.5, including the skipper, for this type of vessel. The actual number of crew depends on a number of factors such as the type of gear, the presence of automatic baiting machines, the size of the vessel, and the amount of sablefish IFQ shares owned by the skipper and crew. Since 1992, total estimated FTE employment in groundfish fisheries in the FGCV 33-59 class has varied between 1,119 and 724. In 2001, about 81 percent of these vessels were owned by Alaska residents, and most of the remainder were owned by Washington residents. Southeast Alaska has had the largest number of vessel owners among the Alaska regions since the late 1980s. The data reveal that there has been a marked decline in participation of vessels owned by residents of Southcentral and Southeast Alaska, while participation by other Alaska regions has remained relatively stable or increased. The regional differences may be due to the opportunistic nature of participation by small boats in groundfish and other fisheries. Residents of Southcentral and Southeast Alaska have relatively more non-fishing income-generating opportunities than residents of Kodiak and the Alaska Peninsula. If the likelihood of big pay-offs in fishing decline, those individuals that can are more likely to engage in non-fishing occupations. Similar declines are not apparent in Washington and Oregon because it is more likely vessel owners in these regions are full-time fishers. Estimated payments per FTE position have varied within a relatively narrow band since 1993, with the exception of 1998, when gross revenues and payments to labor fell due to the Asian economic crisis.

Fixed Gear Catcher Vessels Less than or Equal to 32 ft in Length (FGCV ≤ 32)

Synopsis. These are small vessels that focus on salmon, halibut, and high-value groundfish using a mix of gear types primarily in the central GOA (Table 3.9-16).

Description of the Class. This catcher vessel class includes all vessels that are not TCVs for which vessel length is less than or equal to 32 ft. and the total value of groundfish catch is greater than $1000. These vessels constitute a distinct class because of specific differences when compared to larger fixed gear catcher vessels. A length of 32 ft is the maximum for the Bristol Bay salmon drift gillnet fishery, and vessels in this fishery typically are built to this size limit. A large number of vessels of this size have been built for the Bristol Bay fishery and other salmon fisheries in Alaska. Similar size restrictions do not apply to other salmon management areas in the state. Vessels in this class typically were designed for salmon fisheries. The vessels may use a mix of longline, jig, and sometimes pot gear to harvest halibut and groundfish before or after the salmon season. In 2000, vessels in the FGCV ≤ 32 class had an average length of 30 ft, an average horsepower

rating of about 330, an average gross tonnage of approximately 14 tons, and an average hold capacity of 1,193 cubic ft.

Participation in Groundfish Fisheries. The number of vessels in the FGCV ≤ 32 class decreased significantly in 1995, at least partly as a result of implementation of the halibut and sablefish IFQ system. Groundfish catches are important to the financial health of vessels in the FGCV ≤ 32 class, but non-groundfish species generally account for the majority of the total earnings for the fleet. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 19 percent of all ex-vessel value generated by the class came from groundfish fisheries. The central GOA FMP subarea is the most important fishing area for this class. In recent years, this area has accounted for at least half of the total value of groundfish retained by this fixed gear catcher vessel class. In 1994, Kodiak shoreplants accounted for just 6 percent of the ex-vessel value for the class while Southcentral Alaska processing facilities accounted for 50 percent. By 2000, gross revenues from Kodiak plants were 61 percent of the class total, while Southcentral Alaska plants accounted for 16 percent. This change has come about because of the increasing importance of the Pacific cod fishery to vessels in the FGCV ≤ 32 class.

Groundfish Landings by Species. Landing volumes were significantly greater for A-R-S-O (primarily sablefish) and Pacific cod than for other species during the entire 1992-2001 period. Pollock and flatfish were the least important species. Between 1992 and 2001, the volume of groundfish retained for the class varied between 700 and 1,200 mt. In the same period, ex-vessel value ranged from a high of $1.5 million in 1993 to a low of $0.7 million in 1995.

Employment, Payments to Labor, and Ownership. This analysis assumed an average crew size of three, including the skipper, for this type of vessel. Another 0.5 position was added to the average to account for vessel support staff. The actual number of crew depends primarily on the size of the vessel. Since 1992, total estimated FTE groundfish employment in the FGCV ≤ 32 class has varied between 146 and 77. In 2001, about 84 percent of the vessels in this category were owned by Alaska residents, and the remainder were owned by Washington residents and residents of Other Regions.

Catcher Processors

This section provides brief profiles of the five classes of groundfish catcher processor vessels that participate in the groundfish fisheries off Alaska. In general, catcher processors are integrated operations that harvest fish using various gear types and process them on board. The information provided in this analysis is an abridged version of the detailed sector profiles in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries—2001* (Northern Economics, Inc. and EDAW, Inc. 2001). Each of the catcher processor profiles report generally the same types of information to ease comparisons among classes. The remainder of this introductory section provides an overview of the catcher processor activities from 1992-2001 and describes the unique features that distinguish the various classes from each other.

Five different catcher processor classes were defined for this analysis based on predominant product or gear type. These classes, which are mutually exclusive, are as follows:

1. Surimi trawl catcher processors: These factory trawlers have the necessary processing equipment to produce surimi from pollock and other groundfish. They are generally the largest of all catcher processors.

2. Fillet trawl catcher processors: These factory trawlers have the processing equipment to produce fillets from pollock, Pacific cod, and other groundfish. They are generally smaller than surimi trawl catcher processors and are not surimi-capable according to past production records.

3. Head-and-gut trawl catcher processors: These factory trawlers do not process more than incidental amounts of fillets. Most of the vessels are limited to producing headed and gutted products or kirimi. In general, they do not focus their efforts on pollock, opting instead for flatfish, Pacific cod, rockfish, and Atka mackerel. surimi trawl catcher processors are the smallest of the trawl catcher processors.

4. Pot catcher processors: These vessels have been used primarily in the crab fisheries of the North Pacific, but increasingly they are participating in Pacific cod fisheries. They generally use pot gear but may also use longline gear. They produce whole or headed and gutted groundfish products, some of which may be frozen in brine rather than blast frozen.

5. Longline catcher processors: These vessels, also known as freezer longliners, use longline gear rather than trawls or pots and focus their effort on Pacific cod. Most longline catcher processors are limited to headed and gutted products. They are typically smaller than surimi trawl catcher processors.

Table 3.9-17 summarizes the operations of the five catcher processor classes in 2001. The table provides a comparison of the relative level of activities of the different classes. Of the 89 catcher processors, 39 were trawl catcher processors and 50 used longlines or pots. The 12 surimi trawl catcher processor vessels had the highest total catch of all catcher processors and generated about 41 percent of the catcher processor total gross product value and payments to labor and 34 percent of the total FTE groundfish employment.

Overview of Catcher Processor Activities

Table 3.9-18 summarizes domestic catcher processor activity in the Alaska groundfish fisheries during the 1992-2001 period. The number of active vessels peaked at 136 in 1992 and declined to 88 by 1999. One likely reason for this decline was the inshore-offshore allocations of pollock and Pacific cod. In addition, the decline after 1998 was directly related to the AFA, which mandated the removal of nine trawl catcher processors from the fishery.

From 1992-2001, catcher processors harvested an average of 1,203 thousand mt of groundfish per year. This annual harvest generated an average of 326 thousand mt of product, with an estimated wholesale value of $672 million. The average ton of product had a value of about $2,000. Pollock accounted for about 60 percent of all groundfish harvested by catcher processors, with about 89 percent of all catcher processor harvests coming from the BSAI. Over the ten-year period, catcher processors improved their average product utilization rate from about 24 percent in 1992 to around 30 percent in 2001.

Catcher processors are estimated to have generated an average annual groundfish employment of 4,487 FTE positions between 1992 and 2001, and annual payments to labor averaged $263 million. The vast majority of

catcher processors are owned or operated by Washington-based individuals or corporations, and the WAIW Region accounted for approximately 93 percent of total catcher processor groundfish employment and income in 2001. Data on crew complements are reported weekly to NOAA Fisheries by offshore processors (catcher processors and motherships). Therefore, employment estimates of offshore processors are more reliable than estimates generated for inshore processors, which are based on production to labor ratios derived from survey data collected in the early 1990s.

Drawing on information in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2001), the remainder of this subsection presents summary profiles of the five catcher processor classes. The profile of each catcher processor class includes information on the size and number of vessels; fishing and processing operations; and employment and income linked to regions in Alaska, Washington and Oregon. A summary table provides data on number of active vessels, groundfish catch, groundfish catch by species group; groundfish catch by FMP subarea, quantity and value of the processed products made with groundfish catch, and groundfish employment and payments to labor by region.

Surimi Trawl Catcher Processors

Synopsis. These are large factory trawlers focusing almost exclusively on surimi production in the BSAI pollock fisheries (Table 3.9-19).

Description of the Class. This class is distinct from other trawl catcher processors because all surimi trawl catcher processors have the capacity to produce surimi. Consequently, they are typically the largest catcher processors in the North Pacific. Catcher-processors in the shoreplants class have an average length of 308 ft, an average horsepower rating of about 6,500, an average gross tonnage of approximately 445 tons and an average hold capacity of 50,500 cubic ft. These vessels are capable of harvesting 400 mt or more of fish daily and producing 100 mt or more of frozen surimi or fillets per day. They typically have a full processing deck below the main deck, plus a lower deck of freezer holds. The size of these vessels enables them to operate in the Bering Sea during poor weather. However, they now operate in a pollock cooperative under AFA, which, along with the resulting quasi-property rights, should allow them to modify operations in terms of when they fish and what they process to account for changing weather, markets, and management restrictions.

Participation in Groundfish Fisheries. The number of surimi catcher processors has decreased by about 40 percent since 1992. A combination of excess capacity in pollock surimi production, reduced quotas for the offshore sector, and the decommissioning of vessels under the AFA combined to reduce the number of shoreplants vessels to 12 in 2001. The operational characteristics and activities of these vessels in waters off Alaska are largely determined by the pollock fishing seasons. Their Alaska operations are restricted under the AFA to the Bering Sea and Aleutian Islands regulatory areas. shoreplants vessels focus almost exclusively on pollock, although some have produced surimi from yellowfin sole.

Groundfish Landings by Species. shoreplants vessels focus almost exclusively on pollock, although some have produced surimi from yellowfin sole. In 2001, pollock accounted for nearly all of the total tons of groundfish harvested and wholesale production value of these vessels.

Employment, Payments to Labor, and Ownership. An annual average of 1,641 FTE positions were generated by this vessel class during the 1992-2001 period, and estimated yearly payments to labor averaged $104 million. The registered owners of shoreplants vessels all list addresses in WAIW.

Fillet Trawl Catcher Processors

Synopsis. These are large factory trawlers focusing mainly on fillet production in the BSAI pollock fisheries (Table 3.9-20).

Description of the Class. These trawl catcher processors produce fillets as their primary product from harvests in the BSAI pollock fisheries. The large size of these vessels also provides room for equipment to produce fishmeal, minced product, and other product forms. Pollock is the primary species harvested by this vessel class, but Pacific cod are also targeted. Their operational characteristics and activities in waters off Alaska are largely determined by the fishing seasons for these species. This class has been defined as a distinct class because these vessels do not have the capability to produce surimi, and because of their focus on higher value but more labor-intensive fillet production. Catcher-processors in the shoreplants class have an average length of 250 ft, an average horsepower rating of about 4,550, an average gross tonnage of approximately 490 tons and an average hold capacity of 40,425 cubic ft.

Participation in Groundfish Fisheries. The size of the shoreplants fleet has decreased to less than one-fifth of its peak of 22 in 1993. The elimination of excess fishing capacity under the AFA and declining quotas for the offshore sector resulting from inshore-offshore allocations were two factors that contributed to this decline. Competition from shoreplants vessels with the capacity to switch between surimi and fillets depending on the market for pollock products may be another reason for the smaller number of shoreplants vessels. Fishing season regulations in the BSAI groundfish FMPs allow shoreplants vessels to operate from mid-January through March or April, and from July through October. Because of AFA the remaining vessels in this class can be more selective as to when in the pollock fishing seasons they fish. The Bering Sea is clearly the focus of shoreplants vessels, with the Aleutian Islands accounting for about 10 percent total value prior to it closure to pollock fishing in 1999. Vessels in the shoreplants class have not had significant GOA participation since the implementation of inshore-offshore allocations.

Groundfish Landings by Species. All of the shoreplants vessels reported harvesting the major groundfish species groups (pollock, Pacific cod, flatfish, and the A-R-S-O group) for the 1992-2001 period, although some species were bycatch. In 2001, pollock accounted for 95 percent of the total tons of groundfish harvested.

Employment, Payments to Labor, and Ownership. The average crew size is less for shoreplants vessels than for shoreplants vessels, but larger than for other catcher processor classes. Before the AFA was enacted in 1998, the class generated an average of 1,325 FTE positions per year, but from 1999-2001, FT-SP vessels produced less than 400 FTE positions. Virtually all shoreplants vessels are owned by WAIW entities.

Head-and-gut Trawl Catcher Processors

Synopsis. These are large and medium-sized factory trawlers that primarily produce headed and gutted products from Pacific cod, flatfish, Atka mackerel, and rockfish caught in the BSAI and GOA fisheries (Table 3.9-21).

Description of the Class. This subsection describes the characteristics and activities of trawl catcher processors that primarily produce headed and gutted products from the BSAI and GOA groundfish fisheries. Flatfish is the primary target species for this vessel class, and components of the A-R-S-O species aggregation (primarily Atka mackerel and rockfish) and Pacific cod are important secondary targets. This class was established because 1) it is the only trawl catcher processor group that does not focus on pollock; 2) vessels in this class are smaller than the shoreplants or shoreplants vessels; and 3) surimi trawl catcher processors vessels primarily produce one product form—headed and gutted products.

This focus on trawl fisheries other than pollock results in spatial and temporal differences in the operating patterns of surimi trawl catcher processors vessels compared to shoreplants and shoreplants vessels. Catcher processors in the surimi trawl catcher processors class have an average length of 166 ft, an average horsepower rating of about 2,100, an average gross tonnage of approximately 345 tons and an average hold capacity of 16,650 cubic ft.

Participation in Groundfish Fisheries. The number of surimi trawl catcher processors vessels decreased from 32 in 1995 to 23 in 2001. The surimi trawl catcher processors class targets a number of species and operates for longer periods than the shoreplants and shoreplants classes. Whereas the shoreplants and shoreplants classes operate almost solely in the BSAI, vessels in the surimi trawl catcher processors class operate in both the BSAI and GOA. The target fisheries of the surimi trawl catcher processors class are usually limited by prohibited species catch limits for halibut or market constraints. Only rarely are these vessels able to catch the entire TAC of the target fisheries available to them. The Bering Sea is clearly the focus of these vessels, but a substantial number also fish in the Aleutian Islands, western GOA, and central GOA. Relatively few surimi trawl catcher processors vessels fish in the eastern GOA.

Groundfish Landings by Species. Flatfish species—yellowfin sole and rock sole, in particular—are the primary targets of the surimi trawl catcher processors fleet. These vessels almost never target pollock because headed and gutted pollock sells for less than the cost of production. Species in the A-R-S-O species aggregation have also been very important to the class, particularly Atka mackerel and various rockfish species. In 2001, FLAT and A-R-S-O accounted for about 80 percent of the total tons of groundfish harvested. The recent increase in price of Pacific cod products due to reduced Atlantic cod harvests from the Barents Sea and an improving Asian economy should result in higher gross product values for this class. However, the closure of some of the best fishing grounds for the major target species to protect Bering Sea crab and Steller sea lions has adversely affected the cost structure of the surimi trawl catcher processors boats. In addition, headed and gutted fish harvested by Japanese and Korean vessels from Russian waters is increasing competition in the marketplace.

Employment, Payments to Labor, and Ownership. The smaller vessel size and limited product forms in the surimi trawl catcher processors class result in much smaller crews compared to shoreplants and shoreplants vessels. The average crew size of about 34 persons is about one-third of the average employment

on an shoreplants and less than half of the average crew of a shoreplants vessel. A typical crew might include a captain, a mate, two engineers (one each for the vessel and processing equipment), a cook/housekeeper, two to three crewmembers dedicated to the deck, a processing foreman and assistant, and about 25 processing workers. On some vessels two or three crewmembers may split their time between processing and deck work. Any variation in crew size usually is the result of a change in the number of processing workers employed. An annual average of 1,022 FTE positions were generated by this vessel class during the 1992-2001 period, and estimated yearly payments to labor averaged $55 million. As with vessel owners in the shoreplants and shoreplants classes, most surimi trawl catcher processors vessel owners reside or are located in Washington. Only one surimi trawl catcher processors is currently owned by an Alaskan.

Pot Catcher Processors

Synopsis. These are large and medium-sized vessels that focus on crab fisheries in the Bering Sea but also produce headed and gutted products principally from Pacific cod harvested in the Bering Sea and GOA fisheries (Table 3.9-22).

Description of the Class. The vessels in this class of catcher processors use predominantly pot gear to harvest Bering Sea and GOA groundfish resources. Virtually all vessels in the pot catcher processor class also fish and process crab in the BSAI. In fact, the crab fisheries in the Bering Sea are the primary fisheries for the class and groundfish harvest and production are typically secondary activities. Because of the focus on crab, operating patterns are much different than for other catcher processors. When harvesting groundfish the pot catcher processor class principally targets Pacific cod and other species that can be captured in sufficient numbers with pot gear to generate adequate revenues. The operating characteristics and activities of this class are the result of both crab and groundfish regulations and the use of pot gear. Catcher processors in the pot catcher processor class have an average length of 149 ft, an average horsepower rating of about 1,466, an average gross tonnage of approximately 470 tons and an average hold capacity of 15,705 cubic ft.

Participation in Groundfish Fisheries. pot catcher processor vessels are crab catcher processors that are also capable of processing groundfish. When these vessels are not targeting crab, Pacific cod becomes the primary target. Headed and gutted products are the primary finished products from the pot catcher processor class. During the 1992-2000 period, these products accounted for 88 percent of the wholesale production value for this class. The number of pot catcher processor vessels that process groundfish varied over the past 9 years, reaching a peak of 14 vessels in 1992 and a minimum of 2 vessels in 1993. The success of these vessels in crab fisheries during any given year influences the number of vessels participating in the groundfish fisheries. In recent years, relatively low crab harvests and historically high prices of Pacific cod have made the groundfish fisheries more attractive for pot catcher processor vessels. The Bering Sea FMP subarea is clearly the focus of these vessels.

Groundfish Landings by Species. While participating in groundfish fisheries, pot catcher processor vessels focus on Pacific cod. Other species processed by this class are harvested incidentally. In 2001, Pacific cod accounted for 94 percent of the total tons of groundfish harvested.

Employment, Payments to Labor, and Ownership. This class typically uses a personnel structure similar to that of a catcher vessel. Although the processor vessel requires personnel with some expertise in processing activities, it does not usually hire persons who strictly process, as is the case for other catcher processor

operations. Rather, crewmembers are usually capable of undertaking both fishing and processing tasks, as well as normal ship operational duties. The average pot catcher processor crew size is about 11. Since 1992, annual groundfish employment in the pot catcher processor class has averaged about 36 FTE positions. The relatively small number of FTE positions reflects the fact that pot catcher processor vessels have spent relatively little time participating in the groundfish fisheries. As with vessel owners in the shoreplants, shoreplants, and surimi trawl catcher processors classes, most pot catcher processor vessel owners reside or are located in Washington. One pot catcher processor has been owned by a resident of Kodiak since 1995.

Longline Catcher Processors

Synopsis. These are large and medium-sized vessels that primarily produce headed and gutted products from Pacific cod and other high-value species harvested in the Bering Sea and GOA fisheries (Table 3.9-23).

Description of the Class. Vessels in this class are restricted to producing headed and gutted products for reasons similar to those described for surimi trawl catcher processors vessels—longline regulations plus a lack of space to accommodate additional crew and equipment. Pacific cod is the primary target species, with sablefish and Greenland turbot as important secondary targets. The longline catcher processors class evolved because regulations applying to this gear type provide more fishing days than are available to trawlers. These vessels are able to produce relatively high-value products that compensate for the relatively low catch volumes associated with longline gear. Catcher processors in the longline catcher processors class have an average length of 135 ft, an average horsepower rating of about 1,275, an average gross tonnage of approximately 385 tons and an average hold capacity of 13,500 cubic ft.

Participation in Groundfish Fisheries. The number of longline catcher processors vessels decreased from a peak of 56 in 1992 to 39 in 1999. In 2001, 43 longline catcher processors vessels participated in the groundfish fisheries. Most of the product of longline catcher processors boats is marketed overseas, with price determining where product is sold. During the 1992-2000 period, headed and gutted products accounted for about 96 percent of the wholesale production value of the fleet. The longline catcher processors fleet generally begins fishing for Pacific cod on January 1 and continues to April or May. This species is fished again from September 15 to November or December. Most vessels in this class undergo maintenance and repair in the summer months, although several vessels process and custom freeze salmon during this period. The BSAI is by far the most important FMP subarea for the longline catcher processors class.

Groundfish Landings by Species. In 2001, Pacific cod accounted for 79 percent of the total tons of groundfish harvested. The A-R-S-O species complex (primarily sablefish) and flatfish (primarily Greenland turbot) are also important species in terms of volume. Sculpins, which are included in the A-R-S-O species aggregation, are a major component of bycatch of longline catcher processors vessels.

Employment, Payments to Labor, and Ownership. The main employment positions on an longline catcher processors vessel include processing crew, fishing crew, and officers. Large vessels are required to have more licensed officers than are small ones. On smaller vessels, specialized personnel such as the engineer or cook may also have additional crew duties, the processing crew and fishing crew may not be as distinct from one another as they are on larger vessels, and fishing effort must be reduced during processing. A vessel of average size typically has a crew of 16, consisting of six fishers, six processors, a skipper, a cook, an engineer, and an observer. The longline catcher processors class is the most diverse of all the processor classes in terms

of ownership. In 2001, 28 percent of owners resided in Alaska or regions other than WAIW and Oregon Coast Region. Within Alaska, ownership is distributed across all four regions, with 16 of the 23 vessels owned by residents of Southcentral or Southeast Alaska.

Inshore Plants and Motherships

In addition to catcher processors, the groundfish processing sector includes shore-based plants, several floating inshore processors that are moored or anchored near shore in protected bays and harbors, and motherships. Motherships are grouped with inshore processors because they do not catch their own fish and depend on deliveries from catcher vessels. This analysis includes plants engaged in primary processing of groundfish. It does not include plants engaged in secondary manufacturing, such as converting surimi into analog products (imitation crab), or further processing of other groundfish products into ready-to-cook meals or products. These secondary processors are described in Section 3.9.1.

Seven processor classes were defined for this analysis, primarily based on the regional location of the facilities. The Bering Sea pollock-SP are defined as a separate class because of the large scale of their groundfish operations compared to other processors. The seven classes, which are mutually exclusive, are as follows:

- Bering Sea pollock-shoreplants: Includes the four major shore-based BSAI pollock processors in Dutch Harbor/Unalaska and Akutan. Also includes two floating inshore processors—*Arctic Enterprise and Northern Victor*—that have had substantial pollock history and function from a single location in state waters off Unalaska and Akutan Islands.

- Alaska Peninsula and Aleutian Islands shoreplants: Includes all shoreplants in the Aleutians East Borough and in the Aleutians West Census Area, excluding all Bering Sea pollock shoreplants. In general, these plants are much smaller than Bering Sea pollock shoreplants, do not have the same level of focus on BSAI pollock, and in some cases produce more salmon than groundfish. These plants are treated separately from the Bering Sea pollock shoreplants because of these operational differences.

- Kodiak shoreplants: Includes all shoreplants in the Kodiak archipelago. Many of these plants focus on groundfish but also process some salmon and halibut. Others focus on salmon and halibut but also process some groundfish.

- Southcentral Alaska shoreplants: Includes all shoreplants in the Kenai Peninsula Borough, the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Valdez-Cordova Census Area. In general, these processors focus on salmon and halibut but also process some groundfish.

- Southeast Alaska shoreplants: Includes all shoreplants in Southeast Alaska from Yakutat to Ketchikan. In general, these processors focus on salmon and halibut but also process some groundfish, primarily higher priced species such as rockfish and sablefish.

- Floating Inshore Plants: Includes all floating inshore plants other than *Arctic Enterprise* and *Northern Victor* (which are grouped with Bering Sea pollock-shoreplants).

- Motherships: Includes all motherships operating in the EEZ of the BSAI and GOA. Currently there are only three active motherships. This class does not include floating inshore processors that operate exclusively in state waters.

Table 3.9-24 summarizes activities of inshore processors and motherships by class for 2001. The table provides a comparison of the relative level of activities of the different classes. Overall, 59 facilities contributed to the inshore and mothership processing total in that year. The six Bering Sea pollock-shoreplants were the most substantial contributors, producing 61 percent of the inshore processor wholesale product value and total payments to labor and 68 percent of the total FTE groundfish employment. Motherships accounted for 11 percent of the total product value, and shore-based processors in Kodiak generated 11 percent of the total value of this portion of the groundfish processing sector. Shore plants in Southcentral Alaska and Southeast Alaska contributed only about one percent of the total catch by volume, but because of their focus on high-value species, they generated about 8 percent of the total value.

Overview of Inshore Processor and Mothership Activities

Table 3.9-24 summarizes the activities of inshore processors and motherships in groundfish fisheries during the 1992-2001 period. Inshore processors and motherships profiled in this document rely heavily but not exclusively on groundfish. In 1999, the most recent year for which complete landings data for non-groundfish species are available, about 31 percent of the total ex-vessel value of landings came from groundfish fisheries. While it appears that groundfish are relatively more important in 2000, the non-groundfish numbers shown for 2000 are preliminary and do not include halibut.

Pollock accounted for about 80 percent of all the groundfish retained and processed by inshore processors and motherships between 1992 and 2001. Pacific cod accounted for about 13 percent. Flatfish and species in the A-R-S-O aggregation accounted for about 4 percent each. Approximately 79 percent of all harvests delivered to inshore processors and motherships came from the BSAI. Between 1992 and 2001, inshore processors and motherships generated an average of 258 thousand mt of product per year, with a wholesale value of $573 million. Inshore processors and motherships improved their product utilization rate from 28 percent in 1992 to 37 percent in 2001.

Inshore processors and motherships were estimated to have generated annual groundfish employment averaging 3,861 FTE positions between 1992 and 2001 and annual payments to labor averaging $225 million. Most of the inshore processors are owned by residents of the WAIW Region. However, because the shoreplants are physically located in Alaska, nearly all FTE groundfish employment and payments to labor have been assigned to Alaska coastal communities. Groundfish employment and payments to labor generated by motherships have been assigned to WAIW, as residents of WAIW generally own these vessels. Additional employment and payments to labor have been assigned to WAIW to account for home office staff who are assumed to reside in the same region as the plant owners.

Groundfish employment estimates for inshore plants are based on information gathered in surveys of processors conducted by Northern Economics, Inc. (1990, 1994). The information gathered in the surveys indicated the number of employee hours necessary to generate one ton of product for each product and species. More reliable data on groundfish employment for inshore processors are not available. While the

State of Alaska Department of Labor and Workforce Development regularly collects employment data from processing facilities, the information is aggregated with processing employment in crab and salmon fisheries. If this data were used, groundfish employment would be significantly overestimated.

Drawing on information in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2001), the remainder of this subsection presents summary profiles of the seven processor classes. Each inshore processor/mothership profile describes the facilities in the class and number of participants; the relative dependence on groundfish compared to non-groundfish species such as salmon, crab, halibut, and herring; fishing and processing operations; relationships with different catcher vessel classes; and employment and labor income associated with the groundfish fisheries. Payments to labor and employment are linked to regions in Alaska and the Pacific Northwest. Table 3.9-25 summarizes statistics on the number of processing facilities, groundfish catch of catcher vessels that deliver to the facilities, ex-vessel value of groundfish and non-groundfish retained,[12] groundfish catch by species group, groundfish catch by FMP subarea, ex-vessel value paid to catcher vessels by type, and groundfish employment and payments to labor by region.

Bering Sea Pollock Shore Plants

Synopsis. These are AFA-eligible plants that operate year-round, processing almost all species harvested in the BSAI, and western GOA. Pollock is the most important species processed at these plants in terms of both volume and value (Table 3.9-26).

Description of the Class. This class includes the major onshore plants at Unalaska/Dutch Harbor and Akutan, and the two large floating pollock processors anchored near shore in Beaver Inlet of Unalaska Island or, more recently, in Akutan. These AFA-eligible, shore-based and nearshore plants are the primary markets for groundfish catcher vessels operating in the BSAI, particularly those harvesting pollock. The plants operate year-round, processing almost all species harvested in the BSAI and western GOA. Pollock is the most important species processed at these plants in terms of both volume and value. Pacific cod is the next most important groundfish species, while flatfish and sablefish are substantially less important. These plants also process large amounts of crab and halibut harvested in the BSAI.

Bering Sea pollock shoreplants are a distinct processor class for three reasons: their geographic proximity to each other and the major fishing grounds of the BSAI; the magnitude of the pollock processing at these facilities; and their status as AFA-eligible plants. The nearshore processing ships, *Arctic Enterprise* and *Northern Victor*, are included in this class because they are more similar to shoreplants than to offshore motherships or floating inshore operations, are included in the inshore allocations of pollock, and are treated under AFA as if they were shoreplants.

Participation in Groundfish Fisheries. During the 1992-2001 period, there were six Bering Sea pollock shoreplants—three at Dutch Harbor, one at Akutan, and two floating inshore processors near Unalaska Island or in Akutan Bay. While all Bering Sea pollock shoreplants have the capacity to produce fillets, only three have a long history of fillet production. The other three produce larger quantities of surimi and tend to produce

[12] Ex-vessel value is equal to the amount of fish retained for processing multiplied by the ex-vessel (dockside) price. This value is equal to the payments made by processors for raw fish.

headed and gutted or salted products rather than fillets. Bering Sea pollock shoreplants are the only inshore processors that generate more ex-vessel value in groundfish fisheries than in non-groundfish fisheries. In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 58 percent of the ex-vessel value paid to catcher vessels was from groundfish species. Crab is by far the most important non-groundfish product, accounting for 93 percent of the non-groundfish ex-vessel value in 1999. The plants all process substantial quantities of pollock and Pacific cod. In 2001, pollock accounted for 96 percent of the total tons of groundfish caught. In that year, the Bering Sea FMP subarea accounted for nearly all of the groundfish processed by plants in the Bering Sea pollock-SP class.

Payments to Catcher Vessels and Gross Product Value. Historically, Bering Sea pollock shoreplants have worked closely with larger TCVs, especially vessels in the two TCV BSP classes. On average, vessels in these two classes accounted for roughly 86 percent of the ex-vessel value of groundfish purchases made by Bering Sea pollock-shoreplants from 1992 through 2000. During the 1992-2000 period, surimi accounted for about half of the total wholesale value, and fillets, roe, and meal accounted for the remaining half.

Employment, Payments to Labor, and Ownership. Employment at Bering Sea pollock shoreplants fluctuates markedly by season and the type of product being processed, even if the products are derived from the same species. At one Bering Sea pollock-SP, for example, groundfish employment during pollock roe season is 66 percent higher than it is during non-roe pollock processing. The registered addresses of the owners of all six Bering Sea pollock-SP facilities are in WAIW. A review of the ownership of these facilities was conducted in a previous analysis that examined processing limits for AFA-eligible entities (Northern Economics, Inc. 2000). The study indicated that Japanese companies have ownership shares of at least 50 percent in three of the Bering Sea pollock shoreplants. The study also indicated that two of the other facilities are owned by a single U.S. corporation. This company also owns several trawl and pot catcher processors as well as a fleet of TCVs.

Alaska Peninsula and Aleutian Islands Shore Plants

Synopsis. These are typically multi-species plants that process salmon, crab, halibut and groundfish such as Pacific cod and pollock harvested mainly in the western GOA (Table 3.9-27).

Description of the Class. These plants process groundfish resources from the BSAI and GOA. The shoreplants on the Alaska Peninsula are the oldest in the region, some dating back to the 1800s, while the plant at Adak, the site of a former U.S. Naval facility, has only been operating for a few years. The facilities in the Pribilof Islands are also relatively recent entrants into groundfish processing. The plants in King Cove and Sand Point are AFA-qualified and process pollock. The class also includes several non-AFA plants in Unalaska/Dutch Harbor for which Pacific cod and crab are of particular importance. Some plants in the Alaska Peninsula and Aleutian Islands Shoreplants class are limited in the volume they can handle and their ability to process certain species or product forms. Alaska Peninsula and Aleutian Islands shoreplants historically have relied mainly on non-groundfish species, particularly salmon. As halibut, sablefish, and crab fisheries developed, they were incorporated into the regional salmon processing pattern. Today, Alaska Peninsula and Aleutian Islands shoreplants are typically multi-species plants, with salmon still serving as the "foundation" species. The plants in the region differ in terms of their relative dependence on salmon, groundfish and crab.

Participation in Groundfish Fisheries. In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 17 percent of the total ex-vessel value was from groundfish species. Crab is the most important species for Alaska Peninsula and Aleutian Islands shoreplants, accounting for about 54 percent of the ex-vessel value paid to catcher vessels in 1999. During the 1992-2000 period, groundfish fillets accounted for about 45 percent of the total wholesale value, while headed and gutted products accounted for 13 percent. In 2001, pollock and Pacific cod accounted for about 95 percent of the total tons of groundfish caught. A majority of the fish used by Alaska Peninsula and Aleutian Islands Shoreplants facilities came from the western GOA FMP subarea, although in some years a significant amount of the fish processed was caught in the Aleutian Islands subarea.

Payments to Catcher Vessels and Gross Product Value. Alaska Peninsula and Aleutian Islands shoreplants historically have worked with a variety of catcher vessels. From 1992 through 2001, TCVs were the most common types of catcher vessels receiving payments from Alaska Peninsula and Aleutian Islands shoreplants, with vessels in the TCV < 60 class receiving the largest share of the ex-vessel value. Wholesale value per ton of round weight deliveries increased dramatically in 1999—from $634 per ton to $920 per ton. These changes are due primarily to changes in Pacific cod processing. At least two new facilities focusing on Pacific cod have come online and product prices have increased to levels well above prices reported by processors in the Bering Sea pollock-SP class.

Employment, Payments to Labor, and Ownership. During the 1992-2001 period, these plants generated an average of about 363 FTE positions per year and an estimated $17 million in annual income. As with shoreplants in other regions, groundfish employment in this class fluctuates markedly by season and the type of product being generated. These seasonal product fluctuations do not affect all components of a plant's work force. There is typically a year round core of 30 to 50 administrative, management, and maintenance staff at each plant, and even during "down" periods a few production workers are required to handle processing odds and ends. For some processing activities the number of persons required is independent of the amount of fish processed (IAI 1998). For example, fish meal processing may be so automated that it requires a fixed number of persons, regardless of the volume processed (IAI 1994). The plants in the region are owned by residents of both Washington and Alaska.

Kodiak Shore Plants

Synopsis. These are diversified processing facilities that receive nearly of all their fish from the central GOA (Table 3.9-28).

Description of the Class. The groundfish processing plants in Kodiak differ from those in Southcentral and Southeast Alaska by their capacity to handle larger volumes of groundfish and more product forms. It should also be noted that several of the plants on Kodiak are owned by entities that are AFA-eligible, but none of the plants themselves participate in AFA cooperatives. According to IAI (1998), Kodiak shoreplants have existed since the 19th century. Initially, plants in Kodiak mainly canned salmon and herring, with some operations reportedly processing frozen halibut. In the 1950s, processing operations expanded to include king crab. Crab processing operations reached a peak in the late 1960s. As these operations began to decline, some processors moved from Kodiak to Dutch Harbor and other ports in order to be closer to Bering Sea king crab fisheries. However, a second boom in king crab stocks near Kodiak Island resulted in the construction of additional plants and expansion of existing ones. After king crab harvests peaked in 1980, Kodiak shoreplants made a

major effort to diversify their operations to include shrimp and groundfish. Processing facilities that did not already process salmon and herring began to do so.

Today, in addition to salmon, Kodiak shoreplants also depend on pollock, Pacific cod, flatfish, and some other species of groundfish. By processing groundfish, plants can operate for longer periods of the year, thereby providing some stability to the work force. In addition, the groundfish market allows vessels to operate over a longer period, provides them with additional income, and enhances the vessel-processor relationship.

Participation in Groundfish Fisheries. Fourteen Kodiak facilities were active in groundfish through 1994, dropping to 10 by 1996. In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 46 percent of the total ex-vessel value was from groundfish species. Salmon and halibut are also important species for Kodiak shoreplants, together accounting for 49 percent of the total ex-vessel value paid to catcher vessels. In 2001, pollock and Pacific cod accounted for 69 percent of the total tons of groundfish caught. Kodiak shoreplants receive nearly of all their fish from the central GOA FMP subarea.

Payments to Catcher Vessels and Gross Product Value. In 2000, vessels in the TCV Div. AFA and TCV Non-AFA classes accounted for 49 percent of deliveries by value, with vessels in the FGCV 33-59 class accounting for about 24 percent of delivery value. The size and composition of the fleet delivering fish varies among plants. One plant may cater to a large number of small longline and pot gear vessels, with an occasional delivery from small trawlers, while another plant's fleet may consist of large trawlers. Most vessels that deliver to Kodiak shoreplants are multi-purpose vessels that change fisheries to meet current market and fishing circumstances. The size of a processor's fleet depends on the season and what species the vessels are targeting. According to IAI (1998), a plant may have a fleet of eight to 16 vessels delivering groundfish and crab. A plant processing pollock usually has a fleet of four to ten trawlers fishing for it. Most plants also have six to ten fixed gear vessels delivering Pacific cod and/or tanner crab. In addition to taking deliveries from their regular fleet, processors will accept deliveries from other vessels if they have the processing capacity. The majority of vessels harvesting groundfish for Kodiak shoreplants are Kodiak-based vessels. Vessels from Newport, Oregon or Seattle augment the local trawl and longline fleets. In 2000, fillets accounted for slightly more than half of the total wholesale value, while headed and gutted products accounted for 22 percent.

Employment, Payments to Labor, and Ownership. During the 1992-2001 period, these plants generated an average of about 609 FTE positions per year and an estimated $32 million in annual income. The percentage of plants on Kodiak owned by residents of Washington has shown an upward trend. Seventy percent were owned by Washington residents in 2001.

Southcentral Alaska Shoreplants

Synopsis. These processors rely mostly on salmon but also process sablefish and other groundfish species harvested mainly in the central GOA and eastern GOA (Table 3.9-29).

Description of the Class. The Southcentral region includes boroughs and census areas that border the marine waters of the GOA (east of Kodiak), Cook Inlet, and PWS, including the Kenai Peninsula Borough, the PWS census area, the Municipality of Anchorage, and the Matanuska-Susitna Borough. Most of the processing plants in this region were established to process salmon. They later expanded into groundfish processing to

increase annual revenues and help cover fixed costs. However, processors in Southcentral and Southeast Alaska process much less groundfish than processors in the three classes discussed previously (Alaska Peninsula and Aleutian Islands shoreplants, Bering Sea pollock shoreplants, and Kodiak shoreplants).

Participation in Groundfish Fisheries. Southcentral shoreplants are located in Anchorage and several communities on the Kenai Peninsula (including Homer, Kenai, Nikiski, Ninilchik, Seward, and Soldotna) and in the PWS Census Area (including Cordova, Valdez, and Whittier). In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 21 percent of the total ex-vessel value was from groundfish species. Salmon is the most important species for Southcentral shoreplants, accounting for 58 percent of the total ex-vessel value paid to catcher vessels in 1999. Between 1992 and 2001, most Southcentral shoreplants reported processing flatfish, Pacific cod and species in the A-R-S-O complex, primarily sablefish. In 2001, species in the A-R-S-O complex accounted for 65 percent of the total tons of groundfish harvested and 88 percent of the wholesale production value. In recent years, two to five processors participating in the groundfish fisheries have not processed pollock. The central GOA FMP subarea is the most important source of groundfish for this processor class. A significant quantity also came from the eastern GOA FMP subarea.

Payments to Catcher Vessels and Gross Product Value. Southcentral shoreplants work primarily with vessels in the FGCV 33 ft to 59 ft and LCV classes reflecting their focus on higher priced groundfish such as sablefish. Between 1992 and 2000, fish delivered by these vessels accounted for more than 85 percent of the ex-vessel value of groundfish. The total value of production varied between $23 million and $40 million. In 2000, headed and gutted products accounted for 85 percent of the total wholesale value from groundfish.

Employment, Payments to Labor, and Ownership. During the 1992-2001 period, these plants generated an average of about 109 FTE positions per year and an estimated $12 million in annual income. In 2001, ownership of Southcentral Alaska shoreplants was evenly divided between residents of Southcentral Alaska and Washington.

Southeast Alaska Shoreplants

Synopsis. These processors depend primarily on salmon but also process sablefish and other groundfish species harvested mainly in the eastern GOA (Table 3.9-30).

Description of the Class. The Southeast Alaska Region extends from Yakutat to Metlakatla. This processor class is similar to the Southcentral shoreplants class, as most Southeast shoreplants began as salmon processing facilities and later expanded into groundfish, particularly higher priced species such as sablefish and rockfish. Groundfish stocks in the region are not nearly as large as those in areas to the west. In addition, the sheltered nature of many of the fishing grounds, most of which are in state waters, has fostered a fleet composed primarily of relatively small vessels that do not use trawl gear. Local vessels catch Pacific cod and rockfish by longline and pot. Southeast shoreplants are not designed to process the large groundfish landings of trawl vessels. It is difficult for them to compete with the BSAI Pacific cod fishery or with those processors that already process pollock.

Participation in Groundfish Fisheries. Communities with active processors include Hoonah, Juneau, Ketchikan, Petersburg, Pelican, Sitka, Wrangell, and Yakutat. According to IAI (1998), all Southeast

shoreplants process multiple species. Groundfish are important to components of the local fishing fleet but are of secondary importance to most processors. In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 20 percent of the total ex-vessel value was from groundfish species. Salmon is the most important species for Southeast shoreplants, accounting for 31 percent of the total ex-vessel value paid to catcher vessels in 1999, while halibut accounted for 25 percent of the ex-vessel value. Between 1992 and 2001, most Southeast shoreplants reported processing flatfish, Pacific cod, and species in the A-R-S-O complex. In 2001, species in the A-R-S-O complex (primarily sablefish) accounted for 94 percent of the total tons of groundfish harvested and nearly all of the wholesale production value. The eastern GOA FMP subarea has historically been the most important source of fish processed by Southeast shoreplants.

Payments to Catcher Vessels and Gross Product Value. Most groundfish catcher vessels delivering to Southeast shoreplants are multi-species harvesters. According to IAI (1998), vessels of 40 to 58 ft in length are probably the most productive vessels in the fleet. Most Southeast shoreplants do not have formal contracts with the vessels that deliver to them. Some processors indicated that they had a "core group" of vessels, which constituted about 40 percent of their total delivery fleet. The vessels in the core group consistently delivered to a single processor, whereas the other vessels tended to shift from processor to processor. The sablefish fleet is smaller than the halibut fleet, which, in turn, is smaller than the Dungeness crab fleet. Nearly all of the fish processed by Southeast shoreplants is caught in state waters. Fixed gear catcher vessels, especially those 33 to 59 ft in length, accounted for most of the total ex-vessel value paid by Southeast shoreplants to groundfish catcher vessels. LCVs were the next most important catcher vessel type.

In 2000, headed and gutted products accounted for 95 percent of the total wholesale value. Southeast shoreplants also produce frozen fillets. When possible, the plants serve the markets for high-price products, such as the seasonal market for fresh Pacific cod in Korea or the domestic market for fresh rockfish. The total value of production varied between $27 million and $42 million.

Employment, Payments to Labor and Ownership. During the 1992-2001 period, these plants generated an average of about 44 FTE positions per year and an estimated $13 million in labor payments. According to IAI (1998), some processors in this class have year-round operations while others operate seasonally. All of the plants have the largest workforce in the summer when salmon is processed. During the off-season a minimal number of people are employed for maintenance and administration. Even the year-round plants have relatively few processing line employees working full-time after the salmon season. Local residents provide most of the labor required to process halibut, sablefish, and species harvested in the winter fisheries. This periodic dependence on local labor distinguishes Southeast shoreplants from processing operations in western Alaska, which almost exclusively employ individuals from outside the region. The summer salmon harvest is the only time in which it is economical for Southeast shoreplants to bring in outside workers. Even then, a few plants can meet their summer labor needs with temporary employees from the local community. When more than one processor operates in the same community there is competition for the available local labor. Those processors with year-round operations usually have an advantage, as they can offer more stable jobs. In addition, processors will offer workers who stay employed with them higher wages in order to maintain a stable workforce.

In 2001, the proportion of Southeast shoreplants owned by individuals residing in Alaska peaked at 53 percent. According to IAI (1998), Southeast shoreplants tend to have been in operation longer than plants

other regions. Both third-generation, family-owned plants and facilities owned by multi-state corporations are present in the Southeast Region.

Motherships

Synopsis. These are large vessels that serve as offshore processors in the Bering Sea pollock fishery (Table 3.9-31).

Description of the Class. Motherships do not catch fish but act as mobile processors. Catcher vessels offload their catch to a mothership for processing, and the mothership, in turn, offloads finished product to trampers (cargo vessels) for transport to foreign or domestic markets. Motherships are among the largest vessels in Alaska's fishing industry. They have an average length of 427 ft, an average horsepower rating of about 5,250, an average gross tonnage of approximately 500 tons and an average hold capacity is 72,770 cubic ft.

The delivery of catch to motherships is performed on the high seas. Catcher vessels can offload without mooring to a mothership by transferring full cod ends to a stern ramp on the mothership. The large size of motherships provides them with considerable processing capacity. Some vessels are reportedly capable of producing 200 mt of finished frozen surimi per day. After the fish are processed, the product is usually stored in freezer holds until offloaded to tramp steamers, which convey the product to Asian markets. Buyers often place inspectors aboard the motherships to monitor product quality. A relatively small amount of groundfish products is offloaded at Unalaska/Dutch Harbor or Seattle. Delivering product to the latter port is an economical option at the end of a season.

Participation in Groundfish Fisheries. In 2001, there were three motherships participating in the groundfish fisheries. In addition to participating in the Bering Sea groundfish fishery, these vessels participate in the whiting fishery off the coasts of Oregon and Washington during the summer. In 2001, pollock accounted for nearly all of the groundfish harvested and wholesale production value

Payments to Catcher Vessels and Gross Product Value. Motherships participating in the groundfish fisheries rely almost exclusively on vessels in the TCV Bering Sea pollock 60 – 124 class for their supplies of fish. In 2001, these catcher vessels were all AFA-eligible. According to IAI (1998), motherships typically rely on a mix of company-owned and independent catcher vessels to supply their processing lines. In the past, independent vessels were usually not formally contracted by a particular mothership, but implementation of the AFA may have resulted in the introduction of formal contracts. Motherships usually provide basic services to those catcher vessels that regularly supply them with fish. The operating schedules for motherships coincide with those of their catcher trawlers. The Alaska groundfish fisheries occur from mid-January through April and from late August through October. The motherships are in port or participating in the whiting fishery in May, June, and July, and typically undergo maintenance and repair from November through early January.

The large size of motherships enables them to produce a wide range of products. In 2000, surimi accounted for 74 percent of the total wholesale value and roe products accounted for about 20 percent.

Employment, Payments to Labor, and Ownership. During the 1992-2001 period, motherships generated an average of about 395 FTE positions per year and an estimated $25 million in annual income. According to IAI (1998), the largest mothership employs between 190 and 200 persons during the peak season. The

number of core staff, including the captain and crew, engineers, and other personnel necessary for at-sea operations, varies by vessel size, but it is less variable than the number of processing crew. The number of processing crew increases dramatically during peak fishing seasons—vessels reportedly employed 45 to 60 percent more people during the peak pollock seasons. Seattle is the point of hire for both salaried and non-salaried (hourly wage) employees. Most of the latter list one of the Pacific Northwest states as their place of residence, but some are not U.S. residents. Nearly all non-salaried employees sign a formal contract before starting work (IAI 1998). All motherships participating in the BSAI and GOA groundfish fisheries are owned by individuals residing in Washington.

Floating Inshore Processors

Synopsis. These are floating facilities that operate in sheltered waters and process mainly non-groundfish species but process some groundfish, especially Pacific cod (Table 3.9-32).

Description of the Class. Floating inshore processors are similar to motherships because they have the ability to change their locations in which they operate in order to maximize opportunities for delivery and efficiency. However, unlike motherships, most floating inshore processors were designed to process crab and salmon and typically do not have stern ramps which would allow delivery of trawl cod ends in open waters. Instead floating inshore processor vessels take deliveries "over the side" employing pumps or brailers—large net bags that are filled with crab or fish on the delivery vessel and moved to the processor using a crane. The use of brailers or pumps requires that the delivery vessels be alongside the process while delivering. Typically, delivery vessels and floaters are separated only by large rubber bumpers. The necessity to take deliveries from vessels alongside means that floating inshore processors must operate in sheltered waters. In fact, many processors in the floating inshore processor class establish semi-permanent moorages with shore-based infrastructures, such as docks, gangways and fresh-water supplies. Processors in the floating inshore processor class have an average length of 215 ft, an average horsepower rating of about 1,580, an average gross tonnage of approximately 400 tons and an average hold capacity of 72,950 cubic ft. Several floating inshore processors are barges and not self-propelled. Floating inshore processors occasionally operate with auxiliary barges operating alongside that process fish meal.

Participation in Groundfish Fisheries. Groundfish is typically a relatively small part of floating inshore processors' annual round of activities. In 1999, the most recent year for which complete landings data for non-groundfish species are available, approximately 3 percent of the total ex-vessel value was from groundfish species. The groundfish that is processed is most often Pacific cod, which is either headed and gutted or filleted, depending primarily on the equipment on board the vessel. For many floating inshore processor vessels, participation in groundfish fisheries is largely dependent on the prospect of a lucrative season in the opilio crab fisheries. If operators believe that the guideline harvest level for opilio is high enough to justify sending the processor north from Puget Sound (where most of the vessels are based), then the floating inshore processors will likely stay on to participate in the groundfish fisheries. Other floating inshore processor vessels focus more on salmon than on crab.

Payments to Catcher Vessels and Gross Product Value. Among all processors, the floating inshore processor class exhibits the least consistency in terms of the type of vessels from which they take deliveries. However, the FGCV 33-59 class has typically been the most important for floating inshore processors. On

average during the 1992-2000 period, catcher vessels in this class have provided nearly 41 percent of the raw product received by floating inshore processors in terms of value.

Between 1992 and 2001, most floating inshore processor vessels reported processing flatfish, Pacific cod and species in the A-R-S-O complex. In 2001, species in Pacific cod accounted for 89 percent of the total tons of groundfish harvested and nearly all of the wholesale production value.

Employment, Payments to Labor, and Ownership. Between 1992-2001, floating inshore processor vessels averaged about $3 million in estimated annual payments to labor from groundfish. Two of the three active floating inshore processor vessels were owned by individuals residing in Washington in 2001.

3.9.3 Regional Socioeconomic Profiles

3.9.3.1 Regulatory Context

The socioeconomic analysis provided in this section is driven by requirements of the NEPA, the MSA, AND EO 12898. Under NEPA, 'economic' and 'social' effects are specific environmental consequences to be examined (40 CFR § 1508.8). This section contains an overview of the standard socioeconomic variables typically found in an EIS, including a summary of population, income and employment data for each region.

This section is also guided, in part, by National Standard 8 under the MSA. National Standard 8 is part of a set of standards that apply to all FMPs and regulations promulgated to implement such plans. Specifically, National Standard 8 states that:

> *Conservation and management measures shall, consistent with the conservation requirements of this [Magnuson-Stevens] Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities and (B) to the extent practicable, minimize adverse economic impacts on such communities (Sec. 301(a)(8)).*

The MSA defines a 'fishing community' as "...a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew, and United States fish processors that are based in such community" (Sec. 3 [16]). NOAA Fisheries further specifies in the National Standard guidelines that a fishing community is "...a social or economic group whose members reside in a specific location and share a common dependency on commercial, recreational, or subsistence fishing or on directly related fisheries dependent services and industries (for example, boatyards, ice suppliers, tackle shops)" (63 FR 24235, May 1, 1998). 'Sustained participation' is defined by NOAA Fisheries as "...continued access to the fishery within the constraints of the condition of the resource" (63 FR 24235, May 1, 1998). Consistent with National Standard 8, this section first identifies affected regions and communities and then describes and assesses the nature and magnitude of their dependence on and engagement in the groundfish fisheries of the North Pacific.

Beyond NEPA and MSA requirements, social and community analysis needs to take into account Executive Order 12898 (59 FR 7629 [1994]), which requires federal agencies to address environmental justice concerns by identifying "disproportionately high and adverse human health and environmental effects...on minority

populations and low-income populations." Existing conditions information needed for subsequent assessment of environmental justice concerns, such as demographic data on minority and low-income populations specific to the relevant groundfish communities, is presented in its own section (Section 3.9.6) for ease of review.

3.9.3.2 Regions and Communities Involved in the North Pacific Groundfish Fishery

In support of the community impact analysis of the various management alternatives under consideration, this section provides a description of the existing regional and community context of the North Pacific groundfish fishery. First, an overview is provided of the fishery as a whole. Next, socioeconomic profiles of six geographic areas with ties to the North Pacific groundfish fishery are provided: four in Alaska, one in Washington, and one in Oregon. The regions were defined based on logical socioeconomic and geographic units. Internal consistency with respect to type of engagement or dependence upon the groundfish fishery was more important in defining the regions than attempting to make them comparable for non-groundfish-related criteria. The regional definitions are consistent with those used in recent groundfish FMP-related analyses, such as the previous (2001) Draft Alaska Groundfish Fisheries Draft Programmatic SEIS, as well as the more recent Steller sea lion protection measures analysis (NMFS 2001), and the detailed sector and community profiles on the NPFMC website (NPFMC website 2002). The regions and their constituent jurisdictions or geographies are listed in Table 3.9-33 and shown on Figures 3.9-6 and 3.9-7. Figure 3.9-8 shows the adjacent FMP areas and subareas.

These regional profiles examine the engagement with, and dependence upon, the fishery from a human geography perspective. The regional profiles are designed to be used in combination with the sector information presented in Section 3.9.2 to provide a rounded perspective on the socioeconomic aspects of the fishery. The sector profiles provide descriptions of the groups engaged in the fishery and their activities; the regional profiles describe how those groups and activities fit into a regional socioeconomic context. The regional descriptions in this section also complement the more detailed sector and regional descriptions presented in the Sector and Regional Profiles of the North Pacific Groundfish Fisheries (NPFMC website 2002) to provide a more comprehensive treatment of the socioeconomic aspects of the fishery.

Quantitative data used in these regional descriptions are derived from the same data sources used in the sector descriptions that appear in Section 3.9.2. Specific data sources, and their limitations, are described in those sections. The geographic reach of the areas of Alaska, Washington, and Oregon potentially related to the North Pacific groundfish fishery—and likely to experience socioeconomic impacts due to the proposed management alternatives—is enormous. At the same time, these areas encompass many communities with few or no direct ties to the fishery itself. The profiles focus primarily on the regional rather than the community level of analysis, but limited community level information is provided for regionally important groundfish communities where strong historical ties to the groundfish fishery are known to exist and where such information is considered important to understand the specific community context of the fishery. Many more communities are home to at least some very small portion of the far-flung groundfish catcher vessel fleet. A number of other communities are the sites of relatively modest volumes of groundfish processing activity or attempting to initiate local processing.

Overview of the North Pacific Groundfish Fishery by Region

This subsection presents comparative information on population, employment and income, processing, processing ownership, and catcher vessel ownership and activity across the regions. In subsequent sections, each region is broken out separately, with a broad regional overview following a common format. The intent is to provide the reader with enough information to place the region in terms of its level of participation in the fishery in a comparative context alongside the other regions, as well as to understand the relative level of importance of pollock and Pacific cod vis-a-vis other groundfish fisheries within each region. The topics introduced in this section are presented in the same order as in the individual profiles themselves. The four Alaskan regional profiles closely parallel each other in presentation, but the two Pacific Northwest regional presentations vary somewhat due to the quite different types of engagement in (or dependence on) the Alaskan groundfish fishery.

Fisheries data have been provided in full time series format (1992-2001) where appropriate. 1992 represents the earliest year for which comparable data are available across processing and harvesting sectors, and 2001 represents the most recent full year for which data are available. Where single year "snapshot" data are more appropriate to the discussion than time series information, data for 1999, 2000, and 2001 are provided. 1999 data are presented as this represents the last full year prior to the implementation of the more sweeping Steller sea lion-related protection management measures. Data from 2000 are presented as a transition year, and interpretation of 2000 data in terms of understanding the impacts of Steller sea lion protection measures is problematic for several reasons, not the least of which is that management conditions changed dramatically during the year itself, so that the year as a whole represents neither pre- nor post-Steller sea lion RPA conditions. Data from 2001 are included as these represent the most current full year data available.[13,14]

Population. The population of the regions varies considerably. Within Alaska, the Alaska Peninsula and Aleutian Islands region had a 2000 population of approximately 6,000; the Kodiak Island region had approximately 14,000 residents; and the Southcentral and Southeast Alaska regions had populations of about 367,000 and 75,000, respectively. In the Pacific Northwest, the Washington Inland Waters region had about 3.9 million residents and the Oregon Coast region had a population of about 105,000. Beyond overall population, the types of communities within the regions also vary considerably. The Alaska regions contain the largest community in the state, Anchorage, that along with its surrounding area, contains nearly half of the state's population, as well as very small relatively isolated traditional communities. Within the Pacific

[13]It should be noted that the 1999-2000 period was a time of structural change for a good part of the groundfish fishery independent of Steller sea lion protection management related issues. The most obvious of these changes were those associated with the AFA which, among other things, reduced the offshore catcher-processor fleet, shifted quota from offshore to inshore, and facilitated the formation of co-ops for offshore catcher processors in 1999 and for inshore and mothership catcher vessels in 2000. A comprehensive discussion of the social impacts of the AFA is beyond the scope of this document, but is provided in the NPFMC's report to Congress. It is sufficient to note that inclusion of 1999 a base year for this analysis does not portray a socioeconomic context in static equilibrium and it is not realistic to assume that all other things are being held equal.

[14]As a methodological note, it should also be stated that while historic time series data in this document are similar to those found in the previous version of the Groundfish Draft SEIS, they are not identical. The reason for this variation is discussed in some detail elsewhere (NPFMC website 2002), but in general results largely from a refinement of data resulting from an improved ability to focus on directed catch (and exclude bycatch). It is the target fisheries that will be subject to the more direct impacts of proposed management alternatives. While consistency with previous documents might be valuable in an abstract sense, it is not particularly important in a practical (pragmatic) sense for the present task. For the purposes of the regional and community impact discussions, the precision of individual numbers is much less important than the accuracy of the nature, direction and magnitude of trends in existing conditions, and the direction and magnitude of change resulting from the proposed alternatives.

Northwest, the regions include the greater Seattle metropolitan area as well as relatively small coastal fishing communities.

The population structure of the regions also varies considerably. As shown in the individual regional profiles, the fishery has an impact on the male-female population balance for some of the Alaskan communities that are the focus of intensive groundfish processing. This is due to the fact that processing workers come to these communities for various lengths of time, and there are many more males than females in this workforce. This type of direct impact on population structure attributable to groundfish is seen in few communities, but these tend to be the communities with the highest level of groundfish-related processing activities. Within Alaska, particularly in the Aleutian and Kodiak Island regions, there is also a relationship between percent of Alaska Native population and commercial fisheries development, with communities that have developed as large commercial fishing communities becoming less Native in composition over time compared to other communities in the region. There are many variables involved, but for a few of the communities noted, the relationship is quite straightforward. These differences in the male/female and Native/non-Native population segments are, to a degree, indicative of the relative degree of isolation or integration of the directly fishery-related population with the social and economic structures of rest of the community. Again, this varies considerably from place to place and is not apparent in the Alaska Southcentral and Southeast regions in the same way it is in the more western regions.

Employment and Income. Employment and income (payments to labor) information presented for each region provides a look at types and levels of economic engagement with the groundfish fishery. Detailed employment and income figures for each region may be found in the community profiles on the NPFMC website (NPFMC website 2002). Information on employment in the processing sector provides insight on the level of employment in the communities that is directly attributable to groundfish fishery activity. The working assumptions with regard to community employment calculations in groundfish processing are relatively crude, due to the limits of the information available. Employees of shoreplants are counted as part of the labor force for the community in which the shoreplant itself is located, while those of the more mobile processors are counted as part of the labor force of the community of residence of the owner of the processing entity. With these assumptions, during 2001 primary or direct Alaska groundfish processing employment ranged from none in the Oregon Coast region to more than 3,500 persons in the Alaska Peninsula/Aleutian Islands region and nearly 3,800 persons in the Washington Inland Waters region. Interpretation of these data in terms of engagement with the community is less straightforward for some regions than for others. For some, processing plants tend to be industrial enclaves that are somewhat separate from the rest of the community, while for others there is no apparent differentiation between the processing workforce and the rest of the regional or local labor pool. For the Washington Inland Waters region, Alaskan groundfish processing work is at sea, so in some respects it does not take place 'in' a community at all. In all cases, however, processing employment tends to be seasonal in nature. A further complication for attribution of socioeconomic impacts to a regional base is the fact that many workers in many sectors perform groundfish-related work in a region or community other than the locations where they have other socioeconomic ties. It is not uncommon for fishery-related workers to spend little money in their work region and to send pay 'home' to another community or region (and, further, legal residence may or may not be consistent with what people think of as 'home' or what may be considered 'home' in terms of where economic benefits ultimately accrue). In this sense, regional employment is indicative of the volume of economic activity, if not a specific level of labor activity directly comparable to other industries. The importance of this flow varies from region

to region and from sector to sector, but is most apparent for the communities that are most heavily engaged in the processing aspect of the groundfish fishery.

Tax and Revenue. Tax and revenue information is presented for each Alaska region to provide a perspective on the role of the groundfish fishery in the underpinning of the local economy. Data are from the Alaska Department of Revenue, Alaska Department of Community and Economic Development (DCED), and local sources, as appropriate. Information on the local tax structure of each relevant community is provided, and the communities and regions vary in the way that direct revenue is collected on fishery-related transactions that occur in the regions. For communities (and boroughs) in the more western Alaska regions, a local fish tax is often a significant source of local revenue. For other regions, direct revenue benefits are more closely tied to the state fish tax. Information is provided for each region on shared taxes and the role of state shared fish tax in relation to these other taxes. Again, there is considerable variability from region to region. Also apparent is the regional differentiation in the importance of the relatively new fishery resource landing tax. This source of revenue comes from the offshore sectors of the fishery, and is designed to capture some of the economic benefits of offshore activity for adjacent coastal Alaska regions. This tax is far more important to the revenue structure of the Alaska Peninsula/Aleutian Islands region than for any other region.

Inshore Processing. Inshore groundfish processing information is presented for each region to facilitate analysis of the volume and value of the groundfish that are landed in a region. The information is broken out by species, and historical information is provided on utilization rate, product value, and value per ton. When examined on a region-by-region basis, these data point out that the groundfish fishery varies widely from one region to another. For example, in 2001, for the Alaska Peninsula/Aleutian Islands region, local groundfish processing activity is relatively focused on pollock, while in the Southeast Alaska region, the fishery is focused much more on the non-pollock, non-cod, non-flatfish, "other" (A-R-S-O) species. Therefore, there are sharp differences in value per ton (about six times greater in the Southeast Alaska region) and in volume (greater in the Alaska Peninsula/Aleutian Islands region, which accounts for about 88 percent of the total volume for the state). These differences correspond with differences in a number of other factors, including the extent to which a local labor force is used in processing and the degree to which a local fleet is harvesting the resource (both measures are high in the Southeast Alaska region, but low in the Alaska Peninsula/Aleutian Islands region). Overall, this information is useful in looking at where fishery resources come ashore, and can be used as a rough indicator of the economic activity generated in processing communities. The relative amount of economic benefit to regions and specific communities varies considerably from place to place, as processing entities are integrated with communities in different ways in different places, and patterns of ownership influence the flow of economic benefits.

Processor Ownership. In part to portray the flow of economic benefits in general and to help characterize them on a regional basis in particular, ownership information is presented for processing entities by region. Caution must be taken in interpreting this information, however, as assignment of entities to regions is based on ownership address information, and this is known to be less than precise in a number of cases due to different criteria for assigning addresses. Also, for entities with ownership interest divided among entities residing in two or more regions, the entire operation was counted for the region with the majority of the ownership interest (and therefore caution must be exercised in the use of this information and this known shortcoming taken into account in interpretation of results). This information includes all processing sectors, both fixed processors in communities and mobile, at-sea processors (motherships and various catcher processor sectors). This information is presented by region, by sector, and by groundfish species. The data

in this section facilitate consideration of how resource utilization is linked to ownership patterns and how those ownership patterns play out among regions. For example, the Alaska Peninsula/Aleutian Islands region has the greatest volume and value processed inshore among all the regions, but ownership of shore processing facilities in this region is highly concentrated among individuals and firms located in the Washington Inland Waters region. The large mobile processors that work the Bering Sea have varying catch and processing locations and at least some ties to adjacent Alaska regions (through CDQ group ownership interest, for example), but ownership again clearly shows predominant ties to the Pacific Northwest. Combining all types of processors (inshore, mothership, and offshore), processors owned by Washington Inland Waters region residents accounted for 97 percent of total reported tons and 95 percent estimated wholesale value of all North Pacific groundfish processed in 2001.

Catcher Vessel Ownership and Activity. Information on catcher vessel ownership patterns is presented to demonstrate the links between resource harvesting and specific regions. As for processors, region of ownership is based on the address of record of the majority owner, so some caution in the interpretation of this information is warranted. It is not unusual for vessels to have complex ownership structures involving more than one entity in more than one region, but the region of majority ownership provides a rough indicator of the direction or nature of ownership ties when patterns are viewed at the sector or vessel class level. Data are presented on the number and types of vessels in the regionally owned fleet and the employment and payments to labor that result from catcher vessel resource activities. Resources from FMP subregions adjacent to the Alaska Peninsula/Aleutian Islands, Kodiak, and other Alaska regions are not uniformly harvested by catcher vessels from those regions. Different regions have varying combinations of local harvesting activity, local processing activity, and ownership of both harvesting and processing entities, and all of these have implications for the role of the groundfish fishery in the local socioeconomic context. For example, in terms of groundfish harvest value and volume, Alaska Peninsula/Aleutian Islands features a mostly non-residential fleet, except for some of the smaller vessel classes. While the highest volume and value of groundfish resources harvest occur near this region, the catcher vessels accounting for most of this activity are from elsewhere (primarily the Washington Inland Waters and Oregon Coast regions). As discussed in the individual region profiles, the higher the catcher vessel harvest volume in a given area, the less 'local' the fleet tends to be. Put another way, the more important the region is to the overall groundfish fishery, the lower the proportion of total catch is likely to be harvested by the local fleet in that region, although recent CDQ partnership arrangements may serve to ameliorate this historical disjunction.

Information on total groundfish harvest by FMP area for each region is provided to allow consideration of distribution of effort by the fleets of the individual regions in different groundfish management areas. In other words, this information facilitates gauging the relative importance of groundfish from each management area to the catcher vessel fleets based in each region. Regions vary widely in how 'local' the catch effort is by the local fleet. For example, catcher vessels in the Southeast Alaska region have a very high concentration of effort in the eastern GOA FMP area, while efforts of catcher vessels based in Kodiak are more wide-ranging. More detailed regional harvest information for Pacific cod and pollock, the two most economically important groundfish species overall, is also provided by FMP. Total regional groundfish harvest is also broken out by species so that relative dependency on species by area can be assessed. In this way, relative dependence on alternative measure impacted resources can be examined, at least in general terms.

Harvest Diversity. Recently produced extended sector and regional profiles (NPFMC website 2002) include a treatment of diversity in the catcher vessel fleet, and discusses a brief treatment of the annual cycle for

groundfish catcher vessels and information on how groundfish fit into that cycle both in terms of timing and value. Information is also presented on how groundfish has fit into overall catcher vessel effort for groundfish catcher vessels over the last several years so that the relative role of groundfish can be seen over time. This information is abstracted for this document, and clearly shows that the relative importance illustrates marked differences between regions.

For each of the regions a section on community rankings by catcher vessel ownership is provided. While most of the rest of the data are regional in nature, the top communities (to the 95th percentile) for vessel ownership are listed to provide a sense of subregional distribution of engagement with the groundfish fishery from the harvest perspective. (Analogous volume information for processing cannot be shown due to confidentiality restrictions, but the top three communities for processing volume/value for each region are identified but not ranked).

Processor Diversity. Diversity information similar to that presented for catcher vessels is also available for processors (NPFMC website 2002) for each of the regions to allow at least a general-level consideration of the relative importance of groundfish, and that information is abstracted in this document. For the larger Bering Sea pollock inshore plants, for example, groundfish accounted for more than 60 percent of total ex-vessel value over the period 1995-1997, while in the Southeast Alaska region, analogous value ranged from 10 to 35 percent over the period 1991-1998. The estimates provided also indicate the amount of groundfish and non-groundfish processed at all regional processors that take deliveries of at least some quantity of groundfish.[15] This document only describes changes in patterns of processor diversity to a limited degree, as they are more clearly associated with local community effects.

Subsistence. Each Alaska region profile contains a brief summary of subsistence resource use for selected communities with known ties to the groundfish fishery. The basic data used for this description were taken from the ADF&G subsistence database. The management of the consumptive use of subsistence resources in Alaska is complex, and is summarized elsewhere (NPFMC website 2002). Groundfish comprise up to 9 percent of total subsistence resources consumed in some communities. Level of Steller sea lion take for subsistence purposes in Alaska coastal communities is mentioned in each of the regional profiles, but is described in more detail in Section 3.9.5 as well as in other existing documentation (NPFMC website 2002). Section 3.9.5 also provides more detail on existing conditions related to a number of other subsistence topics.

Tables 3.9-34 through 3.9-39 present information on participation in the groundfish fishery by region for processing and catcher vessel sectors. Parallel tables are presented for each of the individual regions and provide time series information on most of these same indicators. Confidentiality has been preserved for vessels and processors with few members in any particular class or sector by using a normative value for operations within a particular class that are then adjusted regionally so that regional subtotals will match the actual regional total.

Answers to several "big picture" questions are summarized in the individual regional profiles (and more detailed description is available in the companion community profiles document [NPFMC website 2002]). These include the following questions:

[15] A summary analysis of processors within the four Alaskan regions defined in this study revealed that shore based processors that took deliveries of at least some amount of groundfish accounted for approximately 77 percent of all non-groundfish processed at all shore based processors within those regions.

How have fishing communities in Alaska been affected by the growth of the domestic groundfish fishery?

- On a regional basis, and specifically with respect to the high volume, formerly foreign fleet fisheries, the primary regions that have been affected are the Alaska Peninsula and Aleutian Islands Region and the Kodiak Island Region.

- Within the Alaska Peninsula and Aleutian Islands region, the growth of the domestic groundfish fishery has caused profound changes in the communities of Unalaska and Akutan. In Unalaska, in recent years it has provided the mainstay of the fisheries based portion of the economy and generally reversed the local economic decline that followed the crash of the King crab fishery. Both inshore and offshore sectors have contributed to the local tax base and the economic climate that has fostered the development of a significant support services sector. In Akutan, the groundfish fishery, primarily in the form of a large groundfish oriented shore plant, has transformed the community from a small primarily Native community to a much larger, predominantly non-Native community. The implications of this change should be interpreted with caution; however, as the processor (through an enclave type of development) and the rest of the community remain separate in a number of different ways. Lesser changes have been seen in Sand Point and King Cove, although both have experienced a significant growth in local groundfish processing in recent years. Sand Point's residential catcher vessel fleet has benefitted disproportionately from the development of the groundfish fishery in comparison to other communities in the region, but at the same time, other fishery changes have had the effect of shifting some groundfish processing away from the community. Communities within the Aleutians East Borough with no direct involvement in the groundfish fishery have also benefitted from the borough's fish tax. Other CDQ communities in the region have benefitted in yet other ways.

- Within the Kodiak Island region, the City of Kodiak has been the prime beneficiary of the development of the groundfish fishery. It has served as an important buffer for variation in other fisheries, especially after the decline of the locally important shrimp and crab fisheries, as well as the Bering Sea crab fisheries.

- The Alaska Southcentral and Southeast regions have not seen the level of changes experienced by communities in the Alaska Peninsula/Aleutian Islands region and the Kodiak Island region. The fishing communities in these regions tend to be quite diversified, although groundfish is an important component of this mix for some communities.
- It should also be noted that the development of the domestic groundfish fishery has also been important for regions and communities outside of Alaska, particularly for the Oregon (primarily Newport) catcher vessel sector, and the Washington (primarily Seattle) distant water fleet (catcher vessels, motherships and catcher processors) and regionally based processing and support entities active in the Alaskan groundfish fishery.

How have historic changes in fisheries management affected fishing communities?

- Beyond the overall development of the domestic fishery, a number of fisheries management changes have had significant impacts on the regions and communities.

- With the JV era, expertise in the groundfish fishery was gained, and the foundation was laid for more complete domestic development of the fishery.

- Concerns regarding overcapitalization of the fishery and growth of the offshore sector in the late 1980s led to management actions based on avoiding preclusion of different sectors. This, in turn, had a number of impacts in both Alaskan and Pacific Northwest regions. Inshore/Offshore allocative splits changed the fishery in both the GOA and Bering Sea.

- Implementation of IFQ-based management for sablefish profoundly changed that part of the groundfish fishery.

- License limitation served to cap entries into the fishery, but did not stabilize ownership patterns.

- The evolution of the CDQ program has served to involve entire regions in the groundfish fishery that were not directly involved in the groundfish fishery prior to the implementation of the program.

- The AFA changed the nature of quota allocations between and among sectors. Co-ops were recently formed both offshore (1999) and onshore (2000), and fishery participants are still adapting to the new context. Significant capital was removed (i.e., vessels retired) from the offshore fleet, the race for fish was essentially eliminated, and new types of operational relationships were formed between processors and their harvesting fleets. Ownership structures changed, with increased American ownership overall, and a specific trend of note has been increased investments in the fishery by CDQ groups. In terms of regional or community-based impacts, the beneficial economic impacts of the reduction of the race for fish have accrued to most participants, but perhaps especially to the Washington Inland Waters region, due to the ownership patterns and basic operational structure of the sector. Some adverse support sector impacts have been felt in Unalaska due to lessening of seasonal peak demands. In general, not enough time has passed since the full implementation of the provisions of AFA for all likely impacts to have become manifest.

- Management measures directed toward Steller sea lion protection have made a significant impact on the fishery. Some of the more restrictive measures were imposed in 2000, and a full suite of alternative measures were analyzed by NOAA Fisheries in 2001. Given the recency of these developments and the interactive nature of Steller sea lion-related management changes with other management initiatives, impacts are still unfolding, and are expected to vary significantly from community to community and region to region.

These issues are important to an understanding of the cumulative nature of the impacts of commercial groundfish fisheries development on the relevant communities and regions, as well as to developing an understanding of the present context or an “existing conditions” baseline against which the impact of the various management alternatives will be assessed. It is also important to note that among the analytic challenges in providing a baseline is the fact that some aspects of the industry cannot be 'held equal,' although they are clearly important. First, in trying to isolate community impacts by looking at the intersection of communities and sector entities, the picture is complicated by entities that have a presence in multiple areas, such as both the BSAI and GOA areas, that may experience different types of impacts. Second, some entities have a presence in two or more different sectors (catcher vessels, catcher processors, and shore processing), such that impacts that may be seen as accruing to one sector may be influenced by other sector changes.

Third, entities in the groundfish fishery differ markedly in the degree to which they participate in and depend on other fisheries. This, of course, helps to determine the magnitude of impacts, or the consequences of impacts, experienced by the individual entities and communities. Other types of factors that confound the analysis in fundamental ways are aspects of the fisheries context that are outside of the control of the entities engaged in the fishery. As mentioned above, AFA-related consequences have recently changed the fishery in a number of ways at approximately the same time that Steller sea lion RPA impacts were being realized. Also, Area M salmon changes have had interactive impacts on a number of alternative measure-influenced entities and communities.

In sum, the Alaska groundfish fisheries are taking place in a dynamic socioeconomic context, one that has proven particularly volatile in the past few years. This volatility has resulted at least in some part from changes within the groundfish fishery itself, as well as with respect to other fisheries that, in turn, have fostered interactive or synergistic impacts to the groundfish fishery context. These factors resulted in a 'status quo' that is by no means a set of static conditions. As a result, there are known limitations on the degree to which causality of recent sector and community changes can be assigned to past individual management actions, and this serves to limit the confidence with which projected future changes can be assigned to the proposed alternatives, or that likely changes can be quantified with assurance of accuracy. As a result, the descriptions in this section (and the subsequent impact analysis) are best viewed as indicative of the type, direction and magnitude of changes seen and expected in the groundfish fishery rather than a precise quantification of the socioeconomic parameters of the fishery. A brief overview of the effects of past/present actions and events on regions and communities is summarized in Table 3.9-128.

Alaska Peninsula and Aleutian Islands Region

Overview. The Alaska Peninsula/Aleutian Islands region, shown in Figure 3.9-9, is in several ways the center of the Alaska groundfish fishery in general and the Bering Sea pollock fishery in particular. The adjacent FMP area features the greatest groundfish harvest, and it sees significant activity from both onshore and offshore fishery sectors. In 2001, the region accounted for about 88 percent by volume and 79 percent by value of all groundfish processed in Alaska. During 1992-2000, this region accounted for more than four times the volume of groundfish processed inshore than in the other Alaska regions combined. This volume includes 89 percent of the pollock, 68 percent of the Pacific cod, 42 percent of the flatfish, and 31 percent of the A-R-S-O processed. The relative dependence of regional communities on the groundfish fishery varies greatly. While four of Alaska's top five groundfish landing ports are in this region, some other communities in the region have little, if any, direct involvement with the fishery. Extended profiles of the regionally important groundfish communities of Unalaska/Dutch Harbor, Akutan, King Cove, and Sand Point are available elsewhere (NPFMC website 2002). No groundfish data are yet available for False Pass, but it is known that substantial processing investment has been made in the community, and that at least some groundfish was locally processed during 2001. Groundfish has not been a major focus of processing in St. Paul in recent years, but groundfish do appear in the processing reports for 2000.[16] Additionally Adak, a former military community, has become a significant regional processor of groundfish in the recent past. Although production figures are confidential, it is common knowledge that although no groundfish were landed in the community prior to 1998, it has since become a significant and growing purchaser of groundfish,

[16] It is worth noting that Chignik - although not geographically in the region, is lumped analytically in regional totals for the fishery - has run some groundfish as well, but like St. Paul this is clearly not the main focus of local processing. Brief information on the Chignik groundfish fleet is provided in recently produced groundfish community profiles (NPFMC website 2002).

particularly cod, within the region. This community is quite different in sociocultural terms from the other communities of the region, given its recent development as an industrial site on a converted military base rather than within or adjacent to a traditional community. It is also important to note that within this region the Aleutians East Borough encompasses the communities of Akutan, Cold Bay, False Pass, King Cove, Nelson Lagoon, and Sand Point. Given that changes in tax revenue resulting from changes in groundfish landing patterns in one community within the borough are directly linked to expenditures in other communities in the borough (for example, a decline in fish tax revenue in King Cove paid to the Borough would impact Nelson Lagoon if it were large enough to necessitate reductions in school expenditures), the borough structure would serve to distribute impacts to communities in a different way than seen in the rest of the region that has no such structure.

This region, then, is one of strong contrasts with respect to involvement with commercial fisheries in general, and the groundfish fishery in particular. In terms of the structural links to the groundfish fishery, for the purposes of socioeconomic characterization, there are four main categories of communities within the region that have links to harvesting or shore and offshore processing sectors of the Bering Sea groundfish fishery. These are characterized as follows:

- Communities with well developed socioeconomic ties to both onshore and offshore sectors. This category consists of one community: Unalaska/Dutch Harbor. This community has been the number one fishing port in the United States in terms of volume of catch landed since 1992, and held the number one rank in value of catch landed from 1988 through 1999, slipping to number two in 2000 and 2001. Groundfish (especially pollock) is a central part of the community's fishery-based economy. The community has also seen the development of a significant support service sector in recent years, and this support service sector provides services for a number of sectors engaged in the Bering Sea pollock fishery, including shoreplants, floating processors, catcher vessels, and catcher processors. It is also the shipping hub of the Bering Sea. In line with National Standard 8 under the MSA, Unalaska is both highly 'dependent' upon and 'engaged' in the fishery. This is particularly true when a sense of scale is applied, and considering the importance of the fishery in relation to the overall size of the community, both in economic and social terms.

- Communities with large shoreplants that are also CDQ communities. This category consists of one community: Akutan. Akutan is quite different from Unalaska in that it is the host community to a single rather than to multiple shoreplants, and the 'geo-social' relationship between the plant and the community is of quite a different nature than those found in Unalaska.

- Communities that are not CDQ communities, have shoreplants that process groundfish, but that have no direct ties to the offshore sector. These are the communities of King Cove and Sand Point. These communities as a pair also differ from Unalaska and Akutan in that they historically have had a resident fishing fleet that provides more than a negligible amount of product to the local plant. Sand Point differs from Unalaska, Akutan, and King Cove in that they did not qualify as a site for an AFA catcher vessel co-op. Like each of the other communities listed, Sand Point does have an AFA-qualified plant.

- Communities that are CDQ communities without a large shore groundfish processing presence. This includes Atka, Nikolski, St. George, St. Paul, Nelson Lagoon, and False Pass. These communities are not discussed in this section, as CDQ issues are presented in Section 3.9.4 of this document.

The major groundfish communities in the region display quite different histories and this, in turn, continues to influence community socioeconomic structure.

Site of a traditional Aleut village since long before contact times, Unalaska became a Russian trading port for the fur seal industry in 1768. The pre-World War II American period in Unalaska was characterized by a series of booms and busts. Trade in otter skins was the major economic activity until the turn of the last century. Unalaska has extensive historical links to the groundfish fisheries, with at least some cod fishing and processing taking place for decades. Processing of salmon and herring was established in the early 1900s, although major fisheries based on herring were not established until the late 1920s. The economy was depressed after the War, until interest in the fishing industry was renewed in the late 1950s; the present crab fishery was established in the early 1960s. Since that time, the level of activity associated with commercial fishing and fish processing has both increased and diversified, and is now the basis of the local economy. Large multi-species groundfish shore processing plants in the community include Alyeska, Unisea, and Westward. Royal Aleutian is a large crab processor, and Icicle brings significant processing capacity to the community in the form of mobile processing facilities.

In contrast, the contemporary community of Akutan began in 1878 as a fur storage and trading port for the Western Fur & Trading Company. The company's agent established a commercial cod fishing and processing business that quickly attracted nearby Aleuts to the community, and a church and a school were built that same year. World War II affected Akutan by displacing Alaska Native residents, and they were not allowed to return until 1944. In 1948 the first catcher processor was sent to Akutan, and eventually Akutan became established as a premier port for floating processors. Today a large processing plant west of the village proper processes significant quantities of groundfish as well as crab. The processing plant supplies the community with substantial economic benefit, but large-scale commercial fishing activity is largely not integrated with the daily life of the community. The Trident plant is the principal facility in the Akutan port and, historically, a number of smaller, mobile processing vessels have operated seasonally out of the port of Akutan. Akutan does not have a vessel harbor or an airport in the community. Beyond the limited services provided by the plant, no opportunity exists in Akutan to provide a support base for the other major commercial fisheries. Hence, alternative economic opportunities of any kind are extremely limited.

King Cove is historically a commercial fishing community. King Cove has had processing facilities as part of the community for decades and resident commercial fishing fleets that deliver to local seafood processors with longstanding relationships. Local fishermen traditionally have fished for all major species, including groundfish, herring, crab and salmon, with crab and salmon predominant. King Cove was founded in 1911 when Pacific American Fisheries built a salmon cannery on the site. During this time they also acquired a salmon saltery at Thin Point near King Cove. The original settlers were Scandinavian, other European, and Aleut fishermen. Much of the Aleut population came from Belkofski for employment in the local cannery. However, in 1965 when Alaska outlawed salmon traps in Alaska waters, it signified the end of Pacific American Fisheries. Currently Peter Pan Seafoods Inc. controls Alaska’s largest production facility in King Cove. Salmon is the primary species harvested and processed. The canned salmon output of King Cove in a single season actually exceeds the annual canned production of the entire country of Canada, but change is occurring. Canned salmon markets have declined over time relative to other product forms and groundfish has gained importance in recent years, with the plant qualifying as an AFA facility.

Sand Point, like King Cove, has had processing facilities as part of the community for decades and resident commercial fishing fleets that deliver to local seafood processors with longstanding relationships. Sand Point

was founded in 1898 by a San Francisco fishing company as a trading post and cod fishing station. The cod fishing station employed schooners from its home in San Francisco. It served as a repair and supply center for gold mining during the early 1900s, but fish processing became the dominant activity in the 1930s. World War II affected Sand Point little compared with other communities in the area. The U.S. military built an airport that remains to this day. Aleutian Cold Storage built a halibut plant in 1946. Today it is home to the largest fishing fleet in the Aleutian Chain. Trident operates the current processing plant, processing cod, black cod, halibut, pollock, salmon and other assorted bottomfish. Peter Pan Seafoods Inc. operates a support station in Sand Point for their processing plant in King Cove.

Population. The Alaska Peninsula/Aleutian Islands region has the smallest population (6,008 in 2000) of the four Alaska regions characterized. The regional population has declined in recent years with the closure of the military installation at Adak, formerly the largest community in the region. Unalaska (population 4,283 in 2000) is the largest community in the region, and has ranked first among domestic ports in volume of landings since 1992 and was first in value of landings from 1988 to 1999.[17] Of the other four communities with more than 200 residents in 2000, three (Akutan [population 713], King Cove [population 792], and Sand Point [population 842, the second largest community in the region]) are substantially involved with the groundfish fishery and are the sites of large processing facilities. These communities have a disproportionately male population, consistent with a predominantly male workforce at the seafood plants that, in turn, comprises a significant proportion of the total community population. Although they vary between plants and communities, processor workforces tend to be made up of short-term residents housed in industrial-enclave-type settings.

Employment and Income. Alaska Peninsula/Aleutian Islands communities have a wide range of employment opportunities and income levels. These opportunities are closely related to the commercial fishery in general, and the groundfish fishery in particular. Communities with sizeable seafood processing operations (Akutan, King Cove, Sand Point, and Unalaska) have typically had very low official unemployment rates.[18] Processing workers tend to be in the community because of the employment opportunity, tend to leave when employment terminates, and comprise a significant portion of the population. Among civilian employment sectors, manufacturing, typically associated with seafood processing in this region, has dominated employment. In 1999, 2,958 persons were employed in manufacturing, almost five times as many as in the next most important sector, state and local government. Regional personal income and earnings from manufacturing exceeded earnings of all other sectors combined in 1999.

Tax and Revenue. Commercial fisheries-related taxes are important to the region in absolute and relative terms. Akutan, King Cove, Sand Point, and Unalaska all have local raw fish taxes, and the first three are also subject to a borough raw fish landing tax. Fisheries-related shared taxes accounted for 99.7 percent of all the shared taxes and fees coming to the region from the state in 1999, and total fisheries-related tax revenues

[17]In 2000, Unalaska dropped to second in value of landings behind New Bedford, Massachusetts (where the value of landings totaled $146 million [versus $125 million in Unalaska] on a much lower volume [89 versus 700 million pounds] than landed in Unalaska). At least a portion of the relative drop in Unalaska in 2000 can be attributed to declines in the crab fisheries.

[18]Preliminary 2000 census unemployment data show very high unemployment rates in some communities that typically have reported virtually no unemployment (e.g., Akutan). While still being analyzed, from initial review it is apparent that at the time the 2000 census was taken large numbers of processing workers were present in the community but the plants were temporarily idle between seasons, an anomaly that resulted in very large numbers of persons reported as 'not working.' For practical purposes, this means that 2000 census data on employment/unemployment are not useful for at least some communities, pending further review. This is discussed in more detail in Section 3.9.6.

exceeded $7 million. The offshore processing component paid more than $2 million in Fisheries Resource Landing tax in 1999. This tax is considerably more important in the Alaska Peninsula/Aleutian Islands region, in both absolute and relative terms, than for any other Alaska region.

Inshore Processing. In the Alaska Peninsula/Aleutian Islands region in 2001, pollock comprised more than 93 percent of the groundfish volume processed, Pacific cod 5 percent, and A-R-S-O and flatfish 1 percent each. This pattern by species varies considerably from those of other Alaska regions. With 674,000 total reported metric tons of groundfish processed and 268,000 metric tons of total groundfish final product in 2001, the Alaska Peninsula/Aleutian Islands region dominates the other regions in inshore processing. With a 2001 total product value of $491 million and a value of $727 per metric ton, this region has the highest total value (reflecting enormous volume processed) and the lowest value per ton (reflecting disproportionate dependence on pollock). In 2001, pollock accounted for 88 percent of processed product value, Pacific cod 10 percent, A-R-S-O less than 2 percent, and flatfish about one-tenth of one percent. Within this region, shoreplants are divided into two subsectors for the purposes of this analysis, as noted in Section 3.9.2: the Bering Sea pollock shoreplants and the Alaska Peninsula/Aleutian inshore plants, based on distinctive operational profiles. The Bering Sea pollock shoreplants include three large shore processors in Unalaska, one large shore processor in Akutan, and, as of 2002, one floating processor in Beaver Inlet on Unalaska Island, and one floating processor in Akutan Bay. These same plants have operated every year during the 1992-2000 period (although one of the floaters has moved from Beaver Inlet to Akutan Bay during this time). The Alaska Peninsula/Aleutian inshore plant category is comprised of all other groundfish plants in the region (Aleutians East Borough and the Aleutians West Census Area) exclusive of the six Bering Sea plants (and including the plants in Sand Point and King Cove, among others). The Bering Sea plants dominate processing in the region (and, indeed, the state) in terms of volume of groundfish processed. The number of smaller plants in the region has varied from 5 to 8 per year from 1992 to 2000. In 2000, eight Alaska Peninsula/Aleutian inshore plants (i.e., the regional non-Bering Sea pollock sector plants) reported processing groundfish in Adak (1), Chignik (1), Unalaska/Dutch Harbor (3), King Cove (1), Sand Point (1), and St. Paul (1).

Processor Ownership. Though the center of both onshore and offshore groundfish processing activity, the Alaska Peninsula/Aleutian Islands region has by far the least ownership of groundfish processing entities of any Alaska region. None of the largest shoreplants are owned by resident entities, and the number of smaller regionally-owned inshore plants varied between zero and six per year over the period 1992-2001. To the extent that economic benefits flow to the location of ownership, most of these benefits leave the region. In terms of reported tons in 2001, groundfish processed by inshore plants owned by residents of the region was equal to less than three-tenths of one percent of the total groundfish processed at plants located in the region. Offshore processing in the region displays the same pattern. Regionally owned shoreplants had a wholesale product value of approximately $1.56 million in 2001, while the analogous figure for motherships was $0. Catcher processors have been well below $1 million for all years data can be disclosed.

Catcher Vessel Ownership and Activity. Groundfish catcher vessel ownership is lower in the Alaska Peninsula/Aleutian Islands region than in any other region. In recent years, none of the AFA TCVs (which supply a very large proportion of the groundfish processed in the region) have been locally owned. Ownership is clustered in two vessel classes (TCV 60 ft and FGCV 33 ft to 59 ft) that tend to work the nearshore fisheries in the GOA. Vessel ownership within the region is strongly clustered in Sand Point and King Cove, with a secondary cluster in Unalaska. Sand Point residents owned 49 percent of the regionally owned groundfish vessels that, in turn, accounted for 59 percent of the total regionally owned vessel value landed

during the period 1992-2000. King Cove residents owned 24 percent of the vessels that, in turn, accounted for 23 percent of the regionally owned vessel landings value over this same period. Analogous figures for Unalaska were 21 percent of regional vessels and 14 percent of regionally owned vessel landings value, respectively. No other community accounted for more than 3 percent of regional vessels or one percent of regional value landed by regionally owned vessels. In 2001, these vessels employed 327 persons, with $2.6 million in payments to labor in groundfish. In 2001, 90 percent of the retained harvest value from these vessels came from the western GOA FMP area. About 34 percent retained harvest volume was Pacific cod, and 64 percent was pollock. For that same year, Pacific cod accounted for 66 percent of total groundfish value, and pollock 33 percent.

Harvest Diversity. For groundfish catcher vessels owned by regional residents, groundfish has accounted for roughly half of the ex-vessel value for major fisheries since 1996, a substantial increase over the early 1990s. These vessels are primarily dependent on the groundfish and salmon fisheries, as each of these two fisheries is economically more important by a factor of four or more than any other fishery. About 7 out of 10 vessels participated in the salmon fishery, about one-third in the halibut fishery, and about one-quarter in crab or other fisheries (NPFMC website 2002).

Processing Diversity. For the smaller groundfish processing plants in the region, groundfish roughly accounted for between 10 and 25 percent of ex-vessel value of landings during 1991-1998, with a general increase over this period. In 1998, groundfish accounted for 23 percent of value, while salmon and crab accounted for 30 and 44 percent, respectively. For the larger Bering Sea pollock inshore plants, groundfish has accounted for more than 50 percent of ex-vessel value of landings from 1991-1998, and well over 60 percent of value for 1995-1997. At these larger plants in 1998, crab accounted for roughly the same proportion of total value as in the smaller Alaska Peninsula/Aleutian Islands inshore plants, and groundfish alone accounted for roughly the same value as groundfish and salmon combined in the smaller plants (NPFMC website 2002).

Subsistence. Akutan, King Cove, Sand Point, and Unalaska have a subsistence resource consumption ranging from about 200 pounds per capita to more than 450 pounds per capita. Of this total, groundfish specifically ranges from 4 to 9 percent of the total. Subsistence use of Steller sea lions is not well documented, but is heaviest in Southwest Alaska and is historically concentrated among relatively few communities (Atka, Akutan, St. George, St. Paul, and Unalaska). Such use has decreased significantly since 1992, and is discussed in more detail in Section 3.9.5.

Tables 3.9-40 through 3.9-45 summarize information on the Alaska Peninsula/Aleutian Islands regional engagement with the groundfish fishery through 2001.

Kodiak Island Region

Overview. The Kodiak Island region encompasses the Kodiak Island Borough, which includes Kodiak Island, other parts of the Kodiak archipelago, and a portion of the Alaska Peninsula, as shown in Figure 3.9-10. Linkages between this region and the groundfish fishery are predominantly associated with the City of Kodiak and its suburbs. Kodiak is the dominant GOA fishing community for groundfish, and is important for salmon, halibut, and other species. In 2001, the region accounted for about 10 percent of the volume and about 13 percent of the value of the total groundfish processed in Alaska. The region accounted for almost 16 percent of the volume of groundfish processed inshore in all regions of the state (1992-2000). This volume included

11 percent of the pollock, 28 percent of the Pacific cod, 54 percent of the flatfish, and 30 percent of the A-R-S-O category of groundfish processed. Within this region, the City of Kodiak is the location of virtually all of the direct links with the commercial groundfish fishery. (Processing data does show that groundfish are also run at Atilak, but this is a relatively specialized operation and very small relative to the aggregated operations associated with the City of Kodiak.) An extended community profile of Kodiak is available elsewhere (NPFMC website 2002).

Traditional communities existed in the area in precontact times, but commercial fish processing in the Kodiak region began on the Karluk spit in 1882. Not long after that, canneries were established in the community of Kodiak. While the quantity and form of shore processing plants in Kodiak have changed, this sector remains an influential component of the fishing industry that is, in turn, fundamental to the community and its economy. Shore processing facilities in the Kodiak region concentrated primarily on salmon and herring prior to 1950, although there was a cold storage facility at Port Williams where halibut was frequently landed. As their common name suggests, the product produced at these facilities was most often canned fish. Cannery operations expanded in the 1950s and 1960s to accommodate king crab processing. Thirty-two processors processed 90 million pounds of crab in 1966. Declining harvest levels, however, prompted several shoreplants to move their operations during the late 1960s and early 1970s to Unalaska/Dutch Harbor in the Aleutian Islands, closer to the larger supply of Bering Sea-Aleutian Island king crab. When king crab stocks started to crash in the late 1960s, some of the remaining Kodiak plants sought to diversify. At least one plant added facilities to separate the previously dominant crab line and the main plant was then converted into a shrimp plant. Many of the plants maintained halibut production lines while they were processing crab, shrimp, and salmon. By the late 1970s a few Kodiak shoreplants, according to one plant manager, started experimenting with groundfish resources "because there wasn't much crab to do." However, the majority of the groundfish caught prior to 1988 was processed aboard foreign vessels, first by wholly foreign operations, and then by joint ventures where American boats delivered to floating foreign processors. Plant and dock expansions fostered the ability of local plants to further utilize groundfish resources. The first surimi production in Alaska took place in Kodiak in 1985. According to the City of Kodiak, Kodiak is currently home port to 770 commercial fishing vessels, making it the state's "largest fishing port." The development or evolution of the Kodiak harvesting fleet has essentially paralleled that of the processors to which they deliver (along with the development of a fleet component that in part or in whole participates in BSAI fisheries).

Population. In 2000, the Kodiak Island region had a population total of 14,256. The City of Kodiak has become the hub community of the region, at present comprising just less than 50 percent of the total Kodiak Island Borough population. Furthermore, a significant part of the region's population lives very near Kodiak in unincorporated areas of the Kodiak Island Borough. When these areas are taken into account, at present approximately 85 percent of the Kodiak Island Borough population lives in and around the City of Kodiak. In terms of ethnicity, the city is about 13 percent Native, while organized communities outside the city are predominantly Native (68 to 94 percent). The predominant minority in the city and its surroundings is Asian and Pacific Islanders, followed by Natives and Blacks. The predominant minority in other (unorganized) regional communities is Caucasian, with few other minorities present.

Employment and Income. The economies of the Kodiak Island region communities are all dependent to some degree on fishing and, for the City of Kodiak, groundfish are an important component of this dependence. In 1999, regional service sector employment outpaced manufacturing, but manufacturing provides more income than any other sector. The fishing sector provides an important base for the retail and government sectors, which follow it in relative size. The military sector is also significant, and is actually

second in income and earnings, primarily because of a local Coast Guard base, the largest in the country. The City of Kodiak can be distinguished from other regional communities in several ways. Whereas the city has relatively low rates of unemployment and poverty, other communities have higher rates. In terms of income measures, the city ranks highest.

Tax and Revenue. The City of Kodiak and the Kodiak Island Borough are the primary taxing entities in the region. City or community services outside the city are quite limited, or are supplied by the Kodiak Island Borough or privately. The Kodiak Island Borough levies a property tax of 9.25 mills, a 5 percent accommodations tax, and a 0.925 percent severance tax on natural resources. Other communities levy limited taxes. The Kodiak Island region is also dependent on income from State of Alaska fisheries taxes. The region's share of the fisheries business tax and fishery resource landing tax amounted to $1,330,856 in 1999.

Inshore Processing. In recent years, groundfish has made up over 70 percent by weight of the fish processed in the Kodiak Island region. In 2001, pollock comprised about 43 percent of the groundfish by volume. Pacific cod made up about 29 percent, A-R-S-O about 13 percent, and flatfish about 17 percent. In terms of value, the pattern is somewhat different. Pollock accounted for 40 percent of product value in 2001, Pacific cod 35 percent, A-R-S-O 17 percent, and flatfish 7 percent. While the volume of groundfish processed in the region is much less than in the Alaska Peninsula/Aleutian Islands region, value per ton of final product was higher. Groundfish has recently comprised 40 to 45 percent of the total value of fish processed in the Kodiak Island region. Since 1995, one plant has operated at Alitak and the rest of the region's plants reporting groundfish processing (11 in 1999 and 10 in 2000) have operated in Kodiak itself.

Processing Ownership. Although Kodiak residents own both onshore and offshore processing facilities, onshore plants that process pollock and Pacific cod are owned predominantly by entities outside the region (1995 to present). Kodiak Island region residents are active in the ownership of offshore processing vessels for groundfish other than pollock. Residents historically have owned three to six offshore processing facilities, with the lower numbers in earlier years. In 2001, catcher-processors owned by regional residents had a wholesale product value of $23.6 million, and shoreplants had an analogous figure of $2.8 million. No motherships were owned by regional residents.

Catcher Vessel Ownership and Activity. The Kodiak Island region-owned fleet is very diverse. Some vessel classes, especially the larger trawl vessels, have displayed remarkable stability over time. Smaller trawlers have become fewer. Fixed gear vessels have increased in number. Most of the fleet's fishing activity is in the central GOA, and product is delivered to Kodiak shoreplants. Regional vessel ownership is heavily concentrated in the City of Kodiak, whose residents over the period 1992-2000 owned 87 percent of all regionally owned vessels, and these vessels, in turn, accounted for 95 percent of regionally owned vessels landings value over this same period. No other community was home to 6 percent or more of the regionally owned vessels, or accounted for more than 2 percent of the total value of the landings of regionally owned vessels over the 1992-2000 period. Since 1991, catcher vessels owned by Kodiak Island region residents have harvested a significant amount of fish in the Bering Sea as well. In 2001, the central GOA accounted for 57 percent of ex-vessel value, and the Bering Sea accounted for 27 percent. The Aleutian Islands, western GOA, and eastern GOA areas accounted for 2, 8, and 4 percent each, respectively. Pacific cod accounted for 25 percent by volume and 45 percent by value of retained groundfish harvest, while pollock accounted for 60 percent of volume and 29 percent by value in 2001.

Harvest Diversity. In terms of the 'annual round' for groundfish catcher vessels owned by residents of the Kodiak Island region, groundfish and other species tend to complement each other. Groundfish have accounted for less than half of the total ex-vessel value accruing to these vessels in recent years. Halibut, crab, and salmon are also important fisheries to these vessels. More than 50 percent of the groundfish catcher vessels participate in the halibut fishery, and more than 33 percent participate in the salmon fishery (NPFMC website 2002).

Processing Diversity. Groundfish have accounted for roughly 30 to 47 percent of ex-vessel value for all onshore processing plants in the Kodiak Island region from 1991 to 1999, with a general increase in value over this period. This increased to about 61 percent for 2000 (with the qualification that halibut numbers were not included in the 2000 totals, so that the significance of this increase is suspect). Groundfish are economically more important than any other species or species group. Salmon are second in importance, in some years being close to (or as recently as 1995 exceeding) groundfish in value. Halibut, while relatively more important for the Kodiak Island region than for the Alaska Peninsula/Aleutian Islands region, generally accounts for less than 20 percent of the ex-vessel value of fish delivered to shoreplants in the Kodiak Island region (NPFMC website 2002).

Subsistence. Kodiak is the single regionally important groundfish community. Residents of the City of Kodiak are reported to harvest and consume about 151 pounds of subsistence resource per capita, of which 72 percent is fish. However, groundfish comprise only about 8 percent of the total (12 pounds per capita). Subsistence use of Steller sea lions is not well documented, but has historically been important in the Kodiak Island region, particularly for the communities of Old Harbor and Akhiok. Such use has decreased since 1992 (see Section 3.9.5).

Tables 3.9-46 through 3.9-51 summarize information on the Kodiak Island regional engagement with the groundfish fishery through 2001.

Southcentral Alaska Region

Overview. The Southcentral Alaska region, shown in Figure 3.9-11, spans the most heavily populated area of the state. In the Southcentral Alaska region, participation in the groundfish fishery varies considerably from other Alaska regions, and the region is little involved with the Bering Sea pollock fishery in particular. In 2001, the region accounted for less than one percent of the volume and 3.8 percent of the value of all groundfish processed in Alaska. While accounting for less than 1 percent of the pollock, 2 percent of the flatfish, and 5 percent of the Pacific cod processed inshore in Alaska regions over the period 1992-2000, the Southcentral Alaska region did account for 19 percent of the A-R-S-O species group. The region also differs from the others by virtue of its connection of communities and ports by a road system and this, in turn, influences the nature of engagement with the groundfish fishery. Homer and Seward serve as the primary ports for groundfish trucked on the Alaska road system. During 1991-1999, groundfish were processed in 11 regional communities, with (in alphabetical order) Cordova, Nikiski and Seward accounting for the majority of processing. Like other regions, the recent situation is somewhat fluid, as Steller sea lion protection measures may have already had significant effects on the groundfish (and especially pollock) fisheries that exist in the region.

The important groundfish communities of Southcentral Alaska have a very different socioeconomic context than those of the previous regions profiled. Cordova, arguably Southcentral's most fishery- dependent

community, has its origins in transportation as well as fishing. One of the first producing oil fields in Alaska was discovered at Katalla, 47 miles southeast of Cordova, in 1902. Cordova became the railroad terminus and ocean shipping port for copper ore from the Kennecott Mine up the Copper River. The Bonanza-Kennecott Mines operated until 1938 and yielded over $200 million in copper, silver and gold. By 1938, however, the ore supply had diminished, the price of copper dropped and the mines and railway closed down. The Katalla oil field produced until 1933, when it was destroyed by fire. The commercial fishing foundation of the local economy dates back to the 1800s. In 1893, commercial fishing had expanded from the Copper River to include PWS. Between 1889 and 1917, canneries opened in locations including Shepherd Point, Eyak Village, Valdez, Port Nellie, Port San Juan, Drier Bay and Canoe Pass. World War I stimulated the development of the fishing industry, though it decreased after the war. Chinese immigrant labor became prevalent in the canneries. By 1924, seven canneries existed in the PWS with two in the Cordova area. Herring fishing began in 1913, and harvesting of commercial razor clams began in 1916 and lasted until the 1964 earthquake. Dungeness crab harvesting began in the 1930s, followed by catching Tanner crab in the late 1960s. Shrimp fishing, longlining of rockfish, sablefish, and lingcod occurred intermittently in the late 1970s, and salmon seining and gillnetting followed thereafter.

The Homer area has been the site of traditional communities since long before contact times. In 1895 the USGS arrived to study coal and gold resources, and soon thereafter local beach mining operations began. In 1899, Cook Inlet Coal Fields Company built a town and dock on the Homer Spit, a coal mine at Homer's Bluff Point, and a 7-mile-long railroad that carried the coal to the end of Homer Spit. Various coal mining operations continued until World War I, and settlers continued to trickle into the area, some to homestead in the 1930s and 40s, others to work in the canneries built to process Cook Inlet fish. Coal provided fuel for homes, and there are still an estimated 400 million tons of coal deposits in the vicinity of Homer. The City government was incorporated in March 1964. After the Good Friday earthquake in 1964, the Homer Spit sunk approximately 4 to 6 ft, and several buildings had to be relocated. Today, sport fishing for halibut and salmon contributes significantly to the economy along with the commercial fisheries. A total of 541 area residents hold commercial fishing permits. In 2000, the estimated gross fishing earnings of residents neared $27 million. The fish dock is equipped with cold storage facilities, ice manufacturing and a vacuum fish-loading system. A sawmill processes borough timber, and wood chips are exported from Homer to Japan. Tourism is also an important component of the local economy (DCED 2002).

Nikiski, now important as a landing/processing/shipping location for the groundfish fishery does not have the type of historical ties to commercial fisheries seen in a number of the other communities. Nikiski is located on the Kenai Peninsula, nine miles north of the city of Kenai. Although Russian fur traders first arrived in 1741, it was not until 1791 that Kenai became the second permanent settlement established by the Russians in Alaska, when a fortified post called Fort Saint Nicholas was built near the community. In 1848, the first Alaska gold discovery was made on the Russian River. In 1869, the U.S. Army established Kenai and in 1899, a Post Office was authorized. The area was homesteaded in the 1940s, and grew from the mid-1950s, when oil exploration led to the first major discovery in the area, the Swanson River oil reserves, 20 miles northeast of Kenai (discovered in 1957). In 1959, natural gas was found in the Kalifornsky beach area 6 miles south of the city of Kenai. By 1964, oil-related industries located within the vicinity included Unocal, Phillips 66, Chevron and Tesoro. Extensive exploration offshore in upper Cook Inlet has established Cook Inlet's middle ground layers containing one of the major oil and gas fields in the world. Today, the main economy is based on the oil industry and derivative products. The industrial complex of Unocal Chemicals produces ammonia and urea for fertilizer, Phillips Petroleum operates a liquid natural gas plant, and Tesoro has a refinery in Nikiski. Fifteen drilling offshore platforms are in the Cook Inlet around Kenai's waters, all equipped with

underwater pipelines bringing the crude oil to the shipping docks on either side of the Cook Inlet and from there directly onto tankers. While petroleum activity dominates, Federal and State agencies, commercial and recreational fishing, fish processing and tourism are also important parts of the economy of the community.

Non-Native settlers began arriving in Seward in the 1890s. Seward became an incorporated city in 1912. The Alaska Railroad was constructed between 1915 and 1923, and Seward developed as the ocean terminus and supply center. By 1960, Seward was the largest community on the Kenai Peninsula. Tsunamis generated after the 1964 earthquake destroyed the railroad terminal and killed several residents. As an ice-free harbor, Seward has become an important supply center for Interior Alaska. At the southern terminus of the Alaska Railroad, Seward has been a transportation hub for decades. The economy also includes tourism, commercial fishing, ship services and repairs, oil and gas development, a coal export facility, a state prison and the University of Alaska's Institute of Marine Services.

Population. At 366,984 persons in 2000, the Southcentral Alaska region is the largest of the four Alaska regions, and it includes Anchorage (population 260,155), as well as small rural communities. Many fishing enterprises and organizations as well as government agencies have offices in Anchorage, and the community is the home of the NPFMC. The Southcentral Alaska region groundfish communities tend to be largely non-Native. The high male-to-female ratio often present in small to moderate-sized communities with relatively large processing capacity (such as Alaska Peninsula/Aleutian Islands communities) is not present in this region. This circumstance reflects both a smaller scale of processing operations and a more resident workforce.

Employment and Income. The economies of the Southcentral Alaska region groundfish communities tend to be more diversified than those of the Alaska Peninsula/Aleutian Islands or Kodiak Island regions. In part, this greater diversification is a function of road-connectedness and associated access to a large population base, as well as the presence of other developable resources. Groundfish are of lesser importance for employment and income to the region in absolute and relative terms than for either the Alaska Peninsula/Aleutian Islands or Kodiak Island regions. In comparison with the manufacturing sector, in 1999 ten sectors in this region had greater employment and income (the service sector alone had 12 times the number of jobs and 8 times the income of manufacturing).

Tax and Revenue. None of the Southcentral Alaska region groundfish processing communities have a local or borough fish tax. At $1,521,569 in fiscal year 1999, 73.3 percent of the region's shared taxes and fees were fisheries-related. This is a higher amount than the Kodiak Island region received (although derived to a lesser extent from groundfish).

Inshore Processing. The groundfish processed in the Southcentral Alaska region in 1999 accounted for less than two percent of the groundfish processed inshore in all Alaska regions. The A-R-S-O species group accounted for 43 percent of the volume reported over the period 1991-1998, and Pacific cod, pollock, and flatfish accounted for 35, 17, and 5 percent of the total, respectively. Pollock landings were highly variable. The groundfish value per mt ($3,380 in 2001) for the Southcentral Alaska region was almost five times higher than in the Alaska Peninsula/Aleutian Islands region. However, the total product value, $23 million in 2001, was approximately 21 times lower than in the Alaska Peninsula/Aleutian Islands region. The differences between the regions can be accounted for by relative importance of comparatively high-value, low-volume groundfish species. In 2001, A-R-S-O accounted for 52 percent of the volume and 82 percent of the product value for all groundfish processed in the region, while Pacific cod accounted for 18 percent of volume and

10 percent of value. Pollock comprised 25 percent of the volume and 9 percent of value of regional processing, with flatfish accounting for 4 percent of volume and far less than one percent of value. Furthermore, the A-R-S-O species group varies internally among regions, with Atka mackerel (lower value) concentrated to the west, and rockfish (higher value) becoming more important to the east. Processing is also different in the aggregate, as shown by the much higher utilization rates in the Southcentral Alaska region (more than 61 percent in 1999) compared to the Alaska Peninsula/Aleutian Islands and Kodiak Island regions (35 and 27 percent in 1999, respectively).[19] In 2000, 17 regional plants reported processing groundfish in Anchorage (2), Cordova (3), Homer (5), Kenai (4), Ninilchik (1), and Seward (2).

Processor Ownership. Groundfish processor ownership by Southcentral Alaska region residents is concentrated in the shore plant sector, with secondary focus on head and gut trawl and longline catcher processor sectors. More processing entities are owned by Southcentral Alaska region residents than by residents of any other Alaska region. For these processors during 1991-1999, A-R-S-O and flatfish far outdistanced Pacific cod in volume for most years. Although variable, Pacific cod, in turn, represented a higher-volume fishery year to year than pollock. In 2001, 18,000 tons with a wholesale value of $25 million were reported for regionally owned processors. Of the total value, $20 million came from shoreplants and $5 million from catcher-processors. There were no motherships owned by regional residents.

Catcher Vessel Ownership and Activity. More groundfish catcher vessels are owned by Southcentral Alaska region residents than by residents of either the Alaska Peninsula/Aleutian Islands or Kodiak Island regions. Fixed gear catcher vessels predominate, and since 1995, five or fewer trawl vessels have been locally owned. In the fixed gear vessel class, smaller vessel classes predominate by a large margin. This pattern is due, in part, to the relatively small scale of fisheries (and processing capacity) in the Southcentral Alaska region, the diversified nature of the fisheries pursued, and the presence of relatively sheltered waters. Ownership of vessels is spread through numerous communities in the region, but (in order of importance) Homer, Anchorage, Cordova, and Seward combined accounted for 63 percent of the total number of regionally owned vessels between 1992 and 2000, and these vessels, in turn, accounted for 73 percent of the ex-vessel value accrued by regionally owned vessels over this same period. Homer accounted for 26 percent of regional value and 32 percent of regional vessels, Anchorage for 19 percent of value and 14 percent of vessels, Cordova for 15 percent of value and 9 percent of vessels, and Seward for 13 percent of value and 8 percent of vessels. No other community accounted for more than 5 percent of value for regionally owned vessels, nor more than 8 percent vessels themselves for the 1992-2000 period. Locally owned vessels harvested groundfish in all five Alaska FMP areas, but relatively little effort is directed at the Aleutian Island eastern GOA areas (4 and 6 percent of value of total groundfish retained harvest for these vessels for each of these areas). In 2001, 67 percent of value came from the central GOA, 14 percent came from the western GOA and 10 percent come from the Bering Sea. In 2001, for retained harvest, 49 percent of volume and 44 percent of value came from Pacific cod, while A-R-S-O accounted for 11 percent of volume and 47 percent of value. Pollock, while comprising 32 percent of total groundfish volume only accounted for 6 percent of total value; flatfish was 7 percent of volume and 3 percent of value for that same year.

Harvest Diversity. In recent years, groundfish has accounted for roughly 25 percent of ex-vessel value for groundfish catcher vessels owned by Southcentral Alaska region residents. In 1998, halibut was the most important species, accounting for about one-third of total ex-vessel value. Groundfish and salmon account

[19]It should be noted, however, that utilization rates are changing (increasing) significantly in the more western regions due, in large part, to recent changes associated with AFA provisions, so this gap will likely narrow somewhat.

for roughly 25 percent and crab about 15 percent of the total ex-vessel value. Fully 75 percent of all groundfish vessels fished halibut, and 6 out of every 10 fished salmon (NPFMC website 2002).

Processing Diversity. Groundfish has accounted for roughly 10 to 35 percent of ex-vessel value at all Southcentral Alaska region inshore plants over the period from 1991 to 1998. In 1998, ex-vessel value was slightly less for groundfish than for halibut (29 and 31 percent, respectively), and quite a bit less important than for salmon (40 percent of ex-vessel value). Virtually no crab is processed at these plants (NPFMC website 2002).

Subsistence. Until May 2000, Homer, Kenai, and Seward were not classified as subsistence communities. Older data suggest that residents of Homer and Kenai consumed between 84 and 94 pounds of subsistence resources per capita per year and zero or less than one pound of subsistence groundfish. No information exists for Seward. Anchorage is not classified as a subsistence community. For Cordova, groundfish are reported as approximately 4 percent (7 pounds per capita) of the total subsistence consumption (179 pounds per person per year). Subsistence use of Steller sea lions in the region is not well documented, but has historically been important for the community of Tatitlek. No other southcentral community is noted to have a regular pattern of harvest for Steller sea lions (see Section 3.9.5).

Tables 3.9-52 through 3.9-57 summarize information on the Southcentral Alaska regional engagement with the groundfish fishery through 2001.

Southeast Alaska Region

Overview. The Southeast Alaska region, shown in Figure 3.9-12, encompasses a wide range of communities from Yakutat to Ketchikan and Prince of Wales Island. In 2001, the Southeast Alaska region accounted for only 0.8 percent by volume and 4.4 percent by value of the groundfish landed and processed in Alaska. In this regard it is much more similar to the Southcentral Alaska region than to the Kodiak or Alaska Peninsula/Aleutian Islands regions. For the period 1992-2000, regional processors accounted for 21 percent of the A-R-S-O ("other groundfish") species category, but one percent or less for flatfish, Pacific cod, pollock, and groundfish taken as a whole. The top three Southeast Alaska region ports account for almost all of the region's reported processing. In alphabetical order, they are Petersburg, Sitka, and Yakutat. All three communities support diverse fisheries, pursued by fishers participating in multiple fisheries. Of most importance are salmon and halibut. The main groundfish fisheries are rockfish and sablefish.

The regionally important groundfish processing ports of Petersburg, Sitka, and Yakutat each have quite different histories. The economy of Petersburg historically has been based on commercial fishing and timber harvests. "Peter's Burg" was founded by Peter Buschmann, who built the Icy Strait Packing Company cannery, a sawmill, and a dock by 1900. His family's homesteads grew into the community, populated largely by people of Scandinavian origin. By 1920, 600 people lived in Petersburg year-round. During this time, fresh salmon and halibut were packed in glacier ice for shipment. Alaska's first shrimp processor, Alaska Glacier Seafoods, was founded in 1916. A cold storage plant was built in 1926. The cannery has operated continuously since its founding, and is now known as Petersburg Fisheries, a subsidiary of Icicle Seafoods, Inc. Petersburg has developed into one of Alaska's major fishing communities with the largest home-based halibut fleet in Alaska, but landings of shrimp, crab, salmon, herring and other fish are also locally important. Several processors operate cold storage, canneries and custom packing services, employing over 1,100 people

during the peak season. The state runs the local Crystal Lake Hatchery, which contributes to the local salmon resource.

Sitka is one of the oldest communities in Alaska. In 1804, the Russian Empire occupied the area, dubbing it New Archangel, until the sale of Alaska in 1867. For sixty-three years Sitka was Russia's major Pacific port with ships calling from many nations, and headquarters of the Russian-American Company - in its heyday the most profitable fur trading company in the world. Furs destined for European and Asian markets were the main export, but salmon, lumber and ice were also exported to Hawaii, Mexico and California. In 1878 one of the first canneries in Alaska was built in Sitka. During the early 1900s, gold mines contributed to its growth. After the U.S. purchased Alaska in 1867, Sitka remained the capital of the Territory until 1906, when the seat of government was moved to Juneau. During World War II, the town was fortified and the U.S. Navy built an air base on Japonski Island across the harbor, with 30,000 military personnel and over 7,000 civilians. The U.S. Coast Guard now maintains the air station and other facilities on the island. The Alaska Pulp Corporation, the major employer in Sitka, closed in September 1993, forcing nearly 400 persons into unemployment. The city is home to a sizable fishing fleet, a U.S. Coast Guard Air Station, which handles marine search-and-rescue missions, a campus of University of Alaska Southeast and the private Sheldon Jackson College. Founded in 1878 the college is the oldest school in Alaska. The economy is diversified with fishing, fish processing, tourism, government, transportation, retail, and health care services. Sitka is a port of call for many cruise ships each summer and fish processing provides seasonal employment. Regional health care services provide approximately 675 jobs. The U.S. Forest Service and U.S. Coast Guard are significant federal employers.

In the 18th and 19th centuries, English, French, Spanish and Russian explorers came to the area around Yakutat. The Russian-American Company built a fort in Yakutat in 1805 to harvest sea otter pelts. In 1884, the Alaska Commercial Company opened a store in Yakutat. By 1886, the black sand beaches in the area were being mined for gold. In 1889 the Swedish Free Mission Church had opened a school and sawmill in the area. A cannery, sawmill, store and railroad were constructed, beginning in 1903 by the Stimson Lumber Company. Most residents moved to the current site of Yakutat to be closer to this cannery, which operated through 1970. During World War II, a large aviation garrison and paved runway were constructed. Troops were withdrawn after the war, but the runway is still in use. The city of Yakutat was formed in 1948, but in 1992, the city was dissolved and a borough was organized. Fishing and subsistence activities are prevalent, and Yakutat's economy depends on fishing, fish processing and government employment. A cold-storage plant is the major private employer, although lodges and fishing charters in the Situk River drainage provide some jobs. Subsistence hunting and fishing activities focus on salmon, trout, shellfish, deer, moose, seals, bears and goats.

Population. In 2000, the region had a total population of 74,820. There is no clear common regional dynamic of community growth in the Southeast Alaska region. Among the important processing communities, Petersburg, Yakutat, and Sitka all display different patterns. Southeast Alaska is ethnically mixed, but communities differ markedly in this matter. Furthermore, ethnic diversity is more limited in the Southeast Alaska region than in the other Alaska regions considered in this document. The main groups present are Caucasians and Alaska Natives, with other groups present only in relatively small percentages. In Sitka and Petersburg, Caucasians are the great majority of the population (74 and 87 percent, respectively), with Alaska Natives at 21 and 10 percent, respectively. Yakutat is 55 percent Native and 43 percent Caucasian. This overall population composition reflects the general identity or 'character' of each community, as the contemporary demographics of Petersburg highlights its Norwegian fishing history, Sitka its diverse

Native/Russian-American history, and Yakutat its Native heritage. Males outnumber females in the region, but no community shows the great differences that are present in the four large groundfish ports of the Alaska Peninsula/Aleutian Islands region.

Employment and Income. Fisheries in general, and groundfish fisheries in particular, are relatively small contributors to Southeast Alaska region employment, especially compared to the government, services, and retail sectors. For the three communities of most concern, fishing and fish processing are more important in absolute terms than the 'average' regional community. Still, the groundfish fishery does not provide a large base for regional employment. There are fewer overall economic opportunities in Yakutat compared to the other two communities.

Tax and Revenue. In contrast to some Alaska groundfish communities in other regions, revenues directly resulting from local landings or processing of groundfish are not the basis for local taxation in the Southeast Alaska region. Only Yakutat has a local fish tax, and it applies to salmon rather than to fish in general (and thus does not apply to groundfish). Shared state fisheries taxes do generate revenue for local communities, however. The region's share of the fisheries business tax and fishery resource landing tax amounted to $2,221,926 in 1999, which was 88 percent of such shared revenue for the region.

Inshore Processing. Most Southeast Alaska regional groundfish processing occurs in Petersburg, Sitka, and Yakutat. These communities differ in the degree to which they participate in groundfish fisheries and in the mix of species that they exploit. Of greatest significance regionally among groundfish is A-R-S-O, the mixed category that lumps Atka mackerel, rockfish, sablefish, and "other" (non-pollock, non-cod, and non-flatfish) groundfish. Most of the active processors in this region use groundfish only as a supplementary product acquired as bycatch. Rockfish are targeted only sometimes as a primary product, and total volume is still low. The groundfish fishery is important for components of the local fleet, but serves a secondary role for most processors. Southeast Alaska processing plants extract a large return from the fish that they process, with a relatively high utilization rate, compared to the Kodiak and Alaska Peninsula/Aleutian Islands regions. At 74 percent in 1999, utilization was over twice that of the Alaska Peninsula/Aleutian Islands region. Product was valued at $5,665 per ton in 2001, which was 6 times greater than the Alaska Peninsula/Aleutian Islands region and 28 percent higher than the comparable value of the Southcentral Alaska region, the next closest region. Total product value was less than one-eighteenth of that of the Alaska Peninsula/Aleutian Islands region, and total retained volume was less than one percent of the volume of that region. For the most part, Southeast regional processors tend to concentrate on higher-value, low-volume species such as sablefish and rockfish that are typically sold whole or as headed and gutted product. In 2001, A-R-S-O accounted for 94 percent of the volume and over 99 percent of the value of all groundfish processed in the region. Pacific cod accounted for one percent of the volume and two-tenths of one percent of the value of the groundfish processed in the region; flatfish accounted for the virtual remainder of the regional volume (4 percent), but its value was negligible on a regional basis. In 2000, 13 regional plants reporting groundfish processing operated in Hoonah (1), Juneau (2), Ketchikan (2), Petersburg (2), Pelican (1), Sitka (3), and Yakutat (2).

Processing Ownership. Groundfish processing capacity in the Southeast Alaska region owned by residents of the region is concentrated in two sectors, inshore processing plants and longline catcher processors. A substantial percentage (half or more) of regional onshore processing capacity is owned by residents of other areas. It appears that regional pollock and flatfish processing is concentrated primarily in non-locally owned onshore facilities. For regionally owned facilities, groundfish of greatest importance are Pacific cod and the A-R-S-O category (mainly sablefish and rockfish). In 2001, catcher-processor wholesale product value was

$10.7 million, while shoreplant wholesale product value was $8.0 million. No motherships were owned by regional residents.

Catcher Vessel Ownership and Activity. Ownership patterns for catcher vessels are much the same as for processors, in that they indicate a fishery more dependent on limited quantities of Pacific cod, rockfish, and sablefish pursued with longline gear rather than higher volumes of fish pursued with trawl gear. Most locally owned vessels are relatively small and use longline gear for groundfish (and probably participate in other fisheries). Sitka, Petersburg, Juneau, and Ketchikan are the most important communities in terms of regional vessel ownership. Over the 1992-2000 period, Sitka vessels accounted for 30 percent of the value of the groundfish landed by the regionally owned fleet, and for 29 percent of the vessels in that fleet. Petersburg residents accounted for 17 percent of the value and 16 percent of the regionally owned fleet, while Juneau residents owned 13 percent of both value and vessels during this period. Ketchikan resident-owned vessels accounted for 7 percent of the ex-vessel value of landings by regionally owned vessels during 1992-2000, and 7 percent of the regionally owned fleet. No other community accounted for more than 4 percent of the regional total for either value or vessels. In 2001, 74 percent of the harvest value came from the eastern GOA, 20 percent from the central GOA, and 3 percent from the western GOA. Approximately 2 and one percent came from the Aleutian Island and the Bering Sea areas, respectively. It is likely that regionally owned vessels harvest and deliver nearly all fish in the A-R-S-O category. In 2001, A-R-S-O accounted for 77 percent of the volume and 97 percent of the value of the harvest, while Pacific cod represented 23 percent of the volume of the total groundfish harvest and 3 percent of the value. The local fleet is a multi-species, multi-gear fleet concentrated in Sitka and Petersburg. For groundfish, the fleet targets sablefish and rockfish. Thus, most of the Pacific cod and pollock processed by the region's shoreplants is harvested and delivered by non-local vessels.

Harvest Diversity. In terms of the fishing annual round, groundfish and non-groundfish species tend to complement each other. The importance of groundfish as a proportion of total ex-vessel value has remained relatively stable, between 30 and 40 percent in recent years. Halibut and salmon each contribute about 25 percent each of the total ex-vessel value. The fleet is relatively diversified, with more than 80 percent of groundfish catcher vessels owned by Southeast Alaska region residents participating in the halibut fishery, and about 70 percent of groundfish vessels participating in the salmon fishery. Twenty-five percent of the vessels also fish for crab. About 60 percent participate in fisheries other than halibut, salmon, and crab (NPFMC website 2002).

Processing Diversity. Groundfish has accounted for roughly 20 to 30 percent of ex-vessel value at regional processing facilities over the period from 1991 to 1998, with a gradual increase in value. Groundfish accounts for roughly 29 percent of the value of total plant production, compared to 40 percent for salmon and 20 percent for halibut (NPFMC website 2002).

Subsistence. Subsistence utilization in the regionally important groundfish communities of Petersburg, Sitka, and Yakutat ranges between about 200 and 400 pounds per capita. Groundfish represents 1 to 5 percent of the total subsistence resources consumed. No community in the Southeast region is noted to have a regular pattern of harvest for Steller sea lions.

Tables 3.9-58 through 3.9-63 summarize information on the Southeast Alaska regional engagement with the groundfish fishery through 2001.

Washington Inland Waters Region

Overview. The Washington Inland Waters region spans a good portion of northwestern Washington, as illustrated in Figure 3.9-13. The Washington Inland Waters region as a whole, and especially the greater Seattle area in particular, is engaged in all aspects of the overall North Pacific groundfish fishery, and is particularly heavily involved in the Bering Sea pollock fishery. While this region is distant from the harvest areas, it is the organizational center of much of the industrial activity that comprises the human components of the fishery. Clearly, specific industry sectors based in or linked to Seattle are substantially engaged in or dependent on the North Pacific groundfish fishery. The scale and diversity of the Washington Inland Waters region makes a socioeconomic assessment directly related to the Alaska groundfish fishery very complex. Seattle's relationship to the Alaska groundfish fishery in general (and the Bering Sea pollock fishery in particular) is paradoxical. When examined from certain perspectives, Seattle is arguably more involved in the Alaska groundfish fishery than any other community. One example is the large absolute number of Seattle jobs in the Alaska groundfish fishery compared to all other communities, whether counted in terms of current residence, community of origin, or community of original hire (setting aside the matter of where the jobs are actually located). On the other hand, when examined from a comparative and relativistic perspective, it could be argued that the fishery is less important or vital for Seattle than for the other communities considered. Using the same example, the total number of Alaska groundfish-fishery-related jobs in greater Seattle compared to the overall number of jobs in Seattle is quite small, in contrast with the same type of comparison for the much smaller Alaska coastal communities. When examined on a community wide basis, one perspective is that Seattle as a whole is more engaged in, but less dependent upon, the groundfish fishery than all of the other previously mentioned "groundfish communities." An extended groundfish-oriented community profile of Seattle is available elsewhere (NPFMC website 2002).

Regional Economy. As can be expected of a region encompassing a large metropolitan area and containing 3.9 million residents, retail trade and services are extremely important economic sectors and are the two largest economic sectors in terms of employment. Manufacturing employs more people than the state and local government sector, followed by finance, construction, wholesale trade, and transportation. The military, civilian federal, agricultural, and mining sectors are relatively small. The fishing industry has a substantial presence in parts of the Washington Inland Waters region, but is greatly overshadowed in terms of employment by other industry sectors. During the period 1992-2001, between 3,718 and 5,973 Washington Inland Waters region residents were employed annually by Alaska groundfish processing sectors. At-sea processor sectors (motherships, trawl catcher processors, and longline catcher processors) are by far the most significant contributors. Due to the methodology employed, in which all employment for these entities accrues to the region of the residence of the owner, regional employment attributable to these sectors is probably overstated in absolute terms. On the other hand, many entities in these sectors have various business relationships with Alaska CDQ groups, and have special arrangements to foster Alaska, and especially Alaska Native, hire. Furthermore, shoreplant employment for Washington Inland Waters region residents may be understated, because all such employment except for head office staff is attributed to the region where the plant is located, and much shoreplant recruiting takes place in the Washington Inland Waters region (as well as elsewhere in the Pacific Northwest and beyond). Payments to labor for processing employment ranged between $232 million and $323 million during this same period.

Processing Ownership. Ownership of Alaska groundfish processing capacity is highly concentrated among owners with residence in the Washington Inland Waters region. This concentration or overwhelming dominance applies to shoreplants, catcher processors and motherships, and varies in degree between sectors.

In 2001, Washington Inland Waters region-owned processors reported processing 1.9 million tons of groundfish (97 percent of all Alaskan groundfish processed in that year). In terms of estimated wholesale value, Washington Inland Waters region-owned processors processed $1.3 billion worth of groundfish in 2001 (95 percent of the total fishery). In 2001, wholesale product value from catcher-processors owned by regional residents was $631.8 million, from shoreplants was $589.7 million, and from motherships was $86.9 million.

Catcher Vessel Ownership. Residents of the Washington Inland Waters region own catcher vessels in each vessel class that participates in the Alaska groundfish fishery. Numbers in all categories except the smaller vessels (fixed gear vessels less than 60 feet [and especially those less than 32 feet] and trawl vessels less than 60 feet) are large relative to ownership levels in the Alaska regions. Catcher vessels owned by residents of the Washington Inland Waters region tend to be larger than those owned by residents of Alaska, and this comparison emphasizes the region's concentration of ownership (and participation) in the BSAI groundfish fisheries. This is especially true for trawl vessels in general and large, AFA-eligible trawlers in particular. Catcher vessel ownership in this region is strongly concentrated in Seattle. During the 1992-2000 period, Seattle residents owned 45 percent of all regionally owned vessels, and these vessels, in turn, accounted for 65 percent of the total regionally owned vessel value of landings. Outside of Seattle, regional vessel ownership is widely dispersed. Residents of no other community accounted for more than 7 percent of the regionally owned vessels, or more than 5 percent of the regionally owned vessel landings value during this period, and a total of 70 communities have at least one or more vessels in this fleet. Catcher vessels owned by Washington Inland Waters region residents accounted for 1,238 employees in 2001, with payments to labor of $54 million. Harvest retained by these vessels is heavily concentrated in the Bering Sea FMP area. In 2001, 81 percent of retained harvest ex-vessel value came from the Bering Sea, 7 percent from the central GOA, and between 3 and 5 percent came from each of the eastern GOA, western GOA, and Aleutian Islands regions. In terms of volume of retained harvest, in 2001, 95 percent was pollock, 4 percent Pacific cod, and less than one percent each of A-R-S-O and flatfish. In terms of value, 75 percent derived from pollock, 10 percent from Pacific cod, and 14 percent from A-R-S-O for the same year. Flatfish value was negligible on a regional basis. Within the region in 1999, 43 percent of the vessels representing 67 percent of the volume and 62 percent of the value of the harvest were located in Seattle, and no other community in the Washington Inland Waters region had residents with ownership of more than 6 percent of the region's vessels or 10 percent of the region's total volume or value of harvest.

Catcher Vessel Diversity. While Alaska groundfish make up the greater part of the ex-vessel value of the harvest by Alaska groundfish catcher vessels owned by Washington Inland Waters region residents, other fisheries are seasonally important. Although harvest volumes and values vary, over the period 1988-1998, groundfish has amounted to about 60 percent of the ex-vessel value of the harvest for these vessels. In 1998 specifically, groundfish comprised 57 percent of the ex-vessel value of the annual harvest round. About 27 percent was from crab, 11 percent from halibut, and 5 percent from salmon. Among regionally owned Alaska groundfish vessels, 47 percent also fished for halibut, about 28 percent also fished for crab, about 28 percent also fished for salmon, and about 27 percent also fished for other species in Alaska FMP areas (NPFMC website 2002).

Tables 3.9-64 through 3.9-69 summarize information on the Washington Inland Waters regional engagement with the groundfish fishery through 2001.

Oregon Coast Region

Overview. For the purposes of this analysis, the Oregon Coast region is defined as the area encompassing Tillamook County, Lincoln County, and Clatsop County, as illustrated in Figure 3.9-14. This area includes those ports and communities in Oregon with the most direct ties to the Alaska groundfish fishery, and had a population of 104,955 in 2000. The Oregon Coast region has long had significant involvement in the Alaska groundfish fishery, from the development of the joint venture fishery through the present. The most visible aspect of this participation is the fleet of catcher vessels based in Oregon that participate in a variety of fisheries across the various Alaska regions. Though Oregon Coast region residents own fewer catcher vessels than the residents of any of the other regions profiled (35 in 2001), these vessels harvested more North Pacific groundfish by volume than the vessels from any other region except the Washington Inland Waters region. In value of harvest, the Oregon Coast region ranked far behind the Washington Inland Waters region but were very close to the Kodiak Island and Alaska Southeast regions, but well ahead of the other two Alaska regions. This activity is highly concentrated in the community of Newport. For the period 1988-1998, Newport accounted for 72 percent of the total harvest volume and 67 percent of the total harvest value of Alaska groundfish by Oregon Coast region owned vessels. No other regional port accounted for eight percent or more of the regional total. Oregon Coast region ports are important for local fisheries as well as the distant Alaska fisheries. Most of the fish landed in Oregon is delivered to Astoria or Newport, the county seats of Clatsop and Lincoln counties, respectively. Onshore facilities to process whiting (from Pacific Northwest waters) are concentrated in Newport.

Regional Economy. The Oregon Coast region economy is relatively diversified and relies heavily on the retail, service, and government sectors. Fish and timber are also significant components of the multi-industry "agriculture, forestry, fishing, and other" and "manufacturing" categories. Manufacturing, as measured by earnings, is similar in magnitude to the retail trade, service, and government sectors. As an aggregated category, however, it is not clear how much of this magnitude is due to fish-related activity. It is almost certain that none of this manufacturing activity is related to Alaska groundfish. There are no onshore plants in this region that process Alaska groundfish, and only one regionally owned longline catcher processor in the years 1992-1994 (none at present). Thus, it would appear that none of this region's processing employment is attributable to Alaska groundfish.

Processing Ownership. There is no current Oregon Coast region ownership of Alaska groundfish processing capacity, and such ownership has been limited in the past.

Catcher Vessel Ownership. Catcher vessel ownership of Alaska groundfish vessels in this region is highly concentrated in Newport. Residents of Newport owned 44 percent of the groundfish vessels owned by the residents of the region over the period 1992-2000, and these vessels, in turn, accounted for 66 percent of the value of all groundfish landings by regionally owned vessels. No other community in the region accounted for more than 14 percent of regionally owned vessels, and none accounted for more than 6 percent of the total value of landings made by regionally owned vessels. On all measures, Newport is clearly the dominant Oregon Coast region community in terms of engagement with North Pacific groundfish fisheries in general, and the Bering Sea pollock fishery in particular. Of the vessels owned by Oregon Coast region residents that participate in the Alaska groundfish fishery, trawlers predominate, followed by pot vessels, longliners, and miscellaneous 'other' vessels in about equal numbers. Trawlers are the most active and productive component of this fleet. They are based primarily in Newport or the nearby area. In employment related to the Alaska groundfish fishery on regionally owned vessels, trawlers supplied the bulk of opportunities in 1998 (about

67 percent of the total). Pot vessels provided 16 percent and longliners about 18 percent. In 2001, retained harvest ex-vessel value derived 64 percent from the Bering Sea, 33 percent from the central GOA, and approximately one percent each from the eastern GOA and the western GOA. Value from the Aleutian Islands was negligible on a regional basis. On a species basis, in 2001 pollock accounted for 83 percent of volume and 62 percent of value of regionally owned vessels, while Pacific cod accounted for 11 percent of volume and 29 percent of value. A-R-S-O and flatfish accounted for about 3 percent of volume each, and approximately 7 percent and 2 percent of value, respectively.

Catcher Vessel Diversity. Catcher vessels owned by Oregon Coast region residents have a specific dependence on the Alaska groundfish fishery, but generally participate in other Alaska fisheries. As a class, these vessels derive a clear majority of their Alaska ex-vessel value from groundfish activity. In 1998 groundfish accounted for almost two-thirds of the Alaska ex-vessel value accruing to this fleet. Crab make up about one-quarter of the ex-vessel value. About half of the groundfish vessels also participate in the halibut fishery, and about one of five participate in the salmon and crab fisheries. About one-third of the Oregon-owned groundfish catcher vessel fleet participates in Alaska fisheries other than groundfish, halibut, crab, or salmon (NPFMC website 2002).

Tables 3.9-70 through 3.9-75 summarize information on Oregon Coast regional engagement with the groundfish fishery through 2001.

3.9.4 Community Development Quota Program

3.9.4.1 Community Development Quota Overview

The CDQ program region differs from the Alaska and Pacific Northwest regions and communities profiled by the nature of its engagement with and dependence upon the Alaska groundfish fisheries. The communities within this region primarily engage in the fishery through the auspices of the program rather than through historic participation in the fishery, so the focus of this section is the program itself rather than a characterization of the many communities in the region.

CDQ Establishment and Purpose

In 1992 the CDQ program was developed to facilitate the participation of BSAI community residents in the fisheries off their shores, as a means to develop a local community infrastructure and increase general community and individual economic and social well-being. The CDQ program was granted in perpetuity through the MSA authorized by the U.S. Congress in 1996. The State of Alaska is responsible for the administration and monitoring of the program. The State administers the program jointly through the DCED (the lead agency) and the ADF&G.

The CDQ program is a federal program that allocates a portion of the TAC (or GHL, as appropriate) for federally managed BSAI species to eligible communities in western Alaska. Originally involving only the pollock fishery, the program has in recent years expanded to become multi-species in nature. The CDQ program includes such species as pollock, Pacific cod, Atka mackerel, flatfish, sablefish, and other groundfish, along with halibut, and crab. Currently, the CDQ program is allocating portions of the groundfish fishery that range from 10 percent for pollock to 7.5 percent for most other species. The CDQ program has contributed to infrastructure development projects within the region as well as loan programs and investment opportunities

for local fishermen. In recent years the program has provided more than 1,000 jobs annually for region residents and yearly wages have exceeded $8 million.

Sixty-five Alaska Native Claims Settlement Act villages near the Bering Sea have established eligibility under federal and state regulations, and these villages formed a total of six non-profit regional groups through which they participate in the program. The State of Alaska and the NOAA Fisheries periodically allocate percentages of each species, based upon its evaluation of the Community Development Plans submitted by individual CDQ groups. The six CDQ groups are: Aleutian Pribilof Island Community Development Association (APICDA); Bristol Bay Economic Development Corporation (BBEDC); Central Bering Sea Fishermen's Association (CBSFA); Coastal Villages Region Fund (CVRF); Norton Sound Economic Development Corporation (NSEDC); and Yukon Delta Fisheries Development Association (YDFDA). The groups have established partnerships with fishing corporations. Local hire and reinvestment of proceeds in fishery development projects are a required part of the program.

In addition to each CDQ group filing a management plan with the State when they apply for their requested share of the overall CDQ allocation, they also file quarterly reports that detail their activities and track their progress in relation to the goals they have set in their management plans. The State can adjust the percentages awarded to each group from one allocation period to the next, based on the State's evaluation of various factors – documented need, adequacy of the proposed plans to use the requested allocation to meet those needs, past performance, and perhaps other needs. Reports summarizing and/or reviewing the activities of the CDQ program have been prepared for several purposes (NPFMC 1998, NRC 1999, DCED 2001, NMFS 2001a), and the existing conditions portion of this regional profile is largely abstracted from the most recent of two of these documents, the Steller Sea Lion Protection Measures SEIS (NMFS 2001a) and the BSAI Crab Rationalization Program Alternatives analysis (NPFMC 2002).

CDQ Performance Overview

Since inception of the CDQ program, it has contributed to fisheries infrastructure development. According to the DCED, during the first decade of the program approximately 9,000 jobs have been created with wages totaling more than $60 million. As annual royalties grow, the revenue streams have permitted development and accumulation of considerable savings and investment capital within the CDQ groups, for use in a variety of future investments. Data suggest that CDQ groups, when taken as a whole, have retained almost half of their gross revenues in some form of equity, whether infrastructure projects, vessel ownership, or cash. Since 1992, the CDQ group's equity growth has averaged 37 percent per annum, or slightly more than $10 million each year. It has been reported by the State of Alaska that, by 1997, CDQ groups had more than 200 people employed in the pollock fishing industry alone, 846 individuals in CDQ training and a total expenditure by CDQ groups of $1,041,309. From 1993 to 1997, CDQ programs generated approximately 1,000 employment positions a year, with associated annual total wages of about $5 million to $8 million. Management and administration accounted for 6 percent of the jobs and 23 percent of the wages. This level of direct engagement in the fishery can only enhance the control communities may exercise over the joint economic activity. CDQ partnerships bring training and employment within the partners' fishing operations and other development benefits, as well as providing vessel loan programs; education, and other CDQ-related benefits. CDQ groups and their residents are able to learn first hand how the industry functions. They are better able to take part in decisions that directly affect business operations and, thus, profitability. A brief overview of the past/present effects of actions and events on CDQ is presented in Table 3.9-128.

CDQ Communities

CDQ communities are remote, isolated settlements with few commercially valuable natural assets with which to develop and sustain a viable, diversified economic base. As a result, economic opportunities have been few, unemployment rates have been chronically high, and communities (and the region) have been economically depressed. CDQ communities border some of the richest fishing grounds in the world, but they have largely been unable to exploit this proximity. The full Americanization of the BSAI fisheries occurred relatively quickly. However, the very high capital investment required to compete in these fisheries precluded small communities from participating in their development. The CDQ program serves to ameliorate some of these circumstances by extending an opportunity to qualifying communities to directly benefit from the productive harvest and use of these publicly owned resources.

As shown in Table 3.9-76, the six CDQ groups contain between one and 21 communities in each group. As seen in this same table, CDQ communities are predominantly Alaska Native villages, with Alaska Native residents comprising 86.8 percent of the combined total population of all CDQ communities. Table 3.9-77 summarizes the six CDQ groups in terms of their membership, approximate populations, and office locations. The total population of the 65 CDQ communities in 2000 was estimated to be 27,073. However, this population figure may include a substantial number of individuals who are not year-round residents. The administrative offices of CDQ groups tend to be located in regional hub communities, near government or industry partner offices, and/or near community or other ongoing projects.

The CDQ communities are geographically dispersed, extending westward to Atka, on the Aleutian chain, and northward along the Bering coast to the village of Wales, near the Arctic Circle, as shown in Figure 3.9-15. According to Sec. 305(i)(1)(B) of the MSA, to be eligible to participate in the CDQ program a community must:

(i) be located within 50 nm from the baseline from which the breadth of the territorial sea is measured along the Bering Sea coast from the Bering Strait to the western most of the Aleutian Islands, or on an island within the Bering Sea;
(ii) not be located on the GOA coast of the north Pacific Ocean;
(iii) meet criteria developed by the Governor of Alaska, approved by the Secretary, and published in the Federal Register;
(iv) be certified by the Secretary of the Interior pursuant to the Alaska Native Claims Settlement Act (43 USC 1601 et seq.) to be a Native village;
(v) consist of residents who conduct more than one-half of their current commercial or subsistence fishing effort in the waters of the Bering Sea or waters surrounding the Aleutian Islands; and
(vi) not have previously developed harvesting or processing capability sufficient to support substantial participation in the groundfish fisheries in the Bering Sea, unless the community can show that the benefits from an approved Community Development Plan would be the only way for the community to realize a return from previous investments.

CDQ Allocations and Harvest

In 1991, NPFMC recommended to the Secretary of Commerce that a fishery CDQ program be created. As initially envisioned, the CDQ program set aside 7.5 percent of the BSAI annual TAC for Alaska pollock for allocation to qualifying rural Alaskan communities. The program was initially proposed to run for a period of 4 years, lasting from 1992 through 1995, but was subsequently extended for an additional 3 years, carrying it through 1998. In subsequent actions, a CDQ program for BSAI halibut and sablefish followed and was implemented in 1995. A CDQ program for BSAI crab was initiated in 1998, and the multi-species groundfish CDQ program was implemented in late 1998. The NPFMC also extended the pollock CDQ allocations permanently by including pollock in the multi-species groundfish CDQ program. The AFA of 1998 increased the pollock allocation for the CDQ program to 10 percent of the annual TAC.

Today, under the current regulations all groundfish and prohibited species caught by vessels fishing for CDQ groups accrue against the CDQ allocations and none accrue against the non-CDQ apportionment of the TAC or prohibited species catch limits. The CDQ groups are required to manage their catch to stay within all of their CDQ allocations. Each CDQ group is allocated a share of the suite of the species subject to CDQ allocations, although not all groups receive allocations of all species or regional populations. The CDQ allocations recommended by the State for 2001-2002 are displayed in Table 3.9-78. In 2001, these percentages represented approximately 185,000 metric tons of groundfish (Table 3.9-79).

Additional details on the harvest amount and wholesale value of the groundfish CDQ allocations are presented in Table 3.9-80 and Table 3.9-81. As noted above, prior to implementation of the multi-species groundfish CDQ program in 1998, the only groundfish species for which CDQ allocations existed were pollock and sablefish. However, other groundfish species were harvested incidentally. After 1998, CDQ allocations became available for all groundfish species, and the harvest of some species such as Pacific cod and Atka mackerel increased.

As shown in Table 3.9-80, pollock dominates the volume of groundfish landings over the years provided, varying between approximately 98 percent of volume each year from 1993-1997 before dropping to around 82 percent by 1999-2000. The current dominant economic importance of pollock and Pacific cod to the CDQ program among the various groundfish species may be seen in Table 3.9-81. As shown, in 2000, pollock and Pacific cod when added together account for $107.67 million (or 96.3 percent) of the $111.80 million total wholesale value of CDQ allocations for all groundfish species for that year. Further, as shown in that same table, wholesale value of pollock value was almost six times greater than that of Pacific cod, and the wholesale value of Pacific cod, in turn, was almost eight times greater than Atka mackerel, the next most valuable groundfish species for that same year (Table 3.9-81).

Table 3.9-82 shows the seasonal variability in the value of groundfish catches. The bimodal distribution in the groundfish fishery is a function of the winter/spring and fall seasons, the timing of which has changed somewhat in the last few years. Fishing is usually more lucrative in the early portion of the year because of the relatively high value of pollock roe.

3.9.4.2 Community Development Quota Group Profiles

The six CDQ groups are made up of regional alliances of Alaska Native villages on or near the Bering Sea. The CDQ groups have emerged through the establishment of a management structure and the formulation of

a detailed business plan. Each group is a CDQ corporation with a board of directors made up of representatives from the communities, executive officers, and professional staff. To facilitate interaction with industry partners and government oversight agencies, most of the CDQ groups established headquarters in Juneau, Anchorage, or Seattle.

The communities are required to invest profits in fishery-related assets such as fishing vessels, processing plants, and port facilities. Contractual arrangements are not typically limited to payment of royalties per ton of quota but also include provisions for training and employment of residents of CDQ villages, scholarship programs, and a variety of other considerations. Some of the groups have used revenue sharing agreements that allow the royalty to vary with product mix and first wholesale prices. Increasingly CDQ groups are taking equity positions in existing commercial harvesting and processing operations, which then use their CDQ allocations. Individual groups have followed a variety of strategies for using their CDQ allocations, and for the investment or other use of the proceeds. Most have formed stable partnerships with established fishing industry participants and have, or are seeking to, invest in the fishery. The following CDQ group profiles are adapted from those contained within the inshore/offshore pollock allocation amendment to the Bering Sea groundfish fishery management plan as updated in subsequent NMFS/NPFMC documents. The dominant importance of pollock and Pacific cod to the CDQ program can be seen in the fact that together they accounted for a full 90 percent of all CDQ royalties for all species (including non-groundfish species) included in the program in 2000.[20] It is important to note, however, as shown in subsequent sections, individual fisheries wholesale value and species royalty rankings do not necessarily directly correspond to levels of employment.

Aleutian Pribilof Island Community Development Association

The communities represented by APICDA are relatively small and located adjacent to the BSAI fishing grounds. As detailed elsewhere (Section 3.9.3), the Aleutian Islands/Alaska Peninsula region is the center of the BSAI groundfish fishery, with Unalaska, Akutan, King Cove, and Sand Point being its primary ports. While all of these communities are within the geographic span of APICDA, only Akutan is a CDQ group member. Unalaska, the largest community in the region and the hub of the Bering Sea fishery, is not a CDQ community but is an *ex officio* member of APICDA and has a non-voting member of the APICDA Board of Directors. Unalaska residents are eligible for APICDA training and education opportunities, many of which are located in Unalaska to take advantage of proximity to the industry, rather than in the other member villages. (King Cove and Sand Point were not eligible for CDQ membership because they are located outside the overall CDQ eligible region [they are located on the GOA], and because they were the sites of substantial existing commercial fisheries development, as detailed elsewhere [Sections 3.9.3 and 3.9.6]).

Currently, APICDA is allocated 14 percent of the pollock and 16 percent of the Pacific cod CDQ allocations, which are shared among its inshore and offshore partners in such a way as to maximize the benefit to APICDA. Because of proximity to the fishing grounds and year-round access to ice-free waters, APICDA's focus is primarily on community development and employment opportunities that occur in or near each community. These villages do not have the same need for factory trawler employment, as do residents of many other CDQ communities, who do not have the same opportunity for local fishery development. This is

[20] As of 2003 a preferred alternative amendment to the BSAI Crab FMP is being analyzed that would increase CDQ allocations for crab from 7.5 percent to 10 percent and bring more species under the program umbrella. Given the state of crab stocks, however, and the relative total values of the fisheries involved, whether or not this amendment is approved will not change the dominant nature of groundfish within the overall CDQ program.

reflected in APICDA's employment statistics, which show one of the highest total employment levels, but a relatively low number of pollock processing jobs. APICDA also has a wide variety of investments in different sectors of the fishery, as well as in tourism, and other areas.

APICDA has employment provisions with both its inshore and offshore partners and has invested, both with them and individually, in a number of fisheries-based development projects in several of its villages, creating a variety of employment opportunities. Though the group has placed residents with all three pollock sectors, APICDA residents in general have shown a preference for non-pollock employment, with the single largest source being renovation and operation of a halibut processing plant in Atka.

Bristol Bay Economic Development Corporation

BBEDC represents 17 villages distributed around the circumference of Bristol Bay, including Dillingham, the second-largest CDQ community with approximately 2,200 residents and the location of BBEDC's home office. BBEDC is currently allocated 21 percent of the pollock and 20 percent of the Pacific cod CDQ harvest.

To date, BBEDC has focused its community development efforts primarily on creating offshore employment opportunities, and it has employed more village residents in pollock processing jobs than any other group. The group changed from one offshore partner to another before the 1996 harvest. BBEDC's current partner is said to hire approximately 20 percent of its crew from CDQ villages.

BBEDC has also invested in a variety of fishing vessels, including part-interest in two pollock catcher processors and a freezer longliner. However, BBEDC also has a program to evaluate investments in regional infrastructure. The group also has active vocational training and internship programs with its offshore partner, and provides internship opportunities with out-of-region and local businesses to develop administrative and other specialized skills. BBEDC is also helping to promote workforce readiness skills through the four Bristol Bay school districts.

Central Bering Sea Fisherman's Association

CBSFA is unusual among CDQ groups in that it represents a single community, St. Paul in the Pribilof Islands. St. Paul is strategically located to serve the Bering Sea fishing industry. As a result, CBSFA has focused attention on working with other island entities to improve St. Paul's harbor facility and on expanding the island's small boat fleet. The group also operates a revolving loan program to provide boat and gear loans to resident fishermen. CBSFA has primarily invested in crab vessels and has a small ownership interest in American Seafoods. CBSFA has been working with industry partners to explore the possibility of developing a multi-species processing facility in St. Paul. Currently the CBSFA is managing 4 percent of the pollock harvest and 10 percent of the Pacific cod harvest.

Reflecting the focus of St. Paul residents on developing local fishing ventures and infrastructure, CBSFA has not seen much demand among residents for off-island processing jobs, either offshore or inshore. The group is partnered with a large offshore company and would like to build on the benefits of product offloads at St. Paul harbor and the attendant support services its residents can provide. Currently, CBSFA receives 4 percent of the pollock and 10 percent of the Pacific cod CDQ harvest.

Coastal Villages Region Fund

CVRF currently manages 24 percent of the pollock and 17 percent of the cod CDQ harvest for its 21 member villages. The villages are located along the coast between the southern end of Kuskokwim Bay and Scammon Bay, including Nunivak Island. This remote area is poorly located to engage in the current Bering Sea fisheries. Furthermore, its residents, for the most part, have had little experience with commercial enterprise. CVRF has focused on helping residents adjust to working conditions outside of the immediate area and employs a training coordinator who actively recruits residents for employment and internship opportunities. CVRF sees a distinct employment advantage in the offshore sector for its residents, primarily because of shorter time commitments and higher wages. However, the group currently has both inshore and offshore partners. has purchased 22.5 percent of American Seafoods, the largest offshore fishing company in the Bering Sea. This investment includes seven factory trawlers.

CVRF provides employment to fishermen through its nearshore CDQ halibut fishery and on a longline vessel that harvests CDQ sablefish. The group continues to be interested in establishing salmon processing facilities both on the Kuskokwim and elsewhere in the region, as well as halibut processing facilities.

Norton Sound Economic Development Corporation

Fifteen villages make up the region represented by NSEDC, which ranges from St. Michael to Diomede. The geographic expanse and diversity of interests among NSEDC's communities are challenging, as are the hurdles to developing local fisheries in this remote area that is ice-bound in winter.

Nevertheless, NSEDC has actively pursued both local fisheries and Bering Sea pollock investment strategies. The group has purchased approximately 50 percent of its offshore processor partner, Glacier Fish Company, including two catcher/processors and a seafood marketing subsidiary. Together with the Glacier Fish Company, NSEDC owns the Norton Sound Fish Company, which operates a longline vessel and employs significant numbers of region residents. The group also owns independently two tender vessels specially built for the Norton Sound region.

NSEDC has developed or planned fisheries development projects in several villages, including Norton Sound Crab Company in Nome and commercial halibut operations on St. Lawrence Island. Glacier Fish Company hires residents of the Bering Sea region on a preferential basis for CDQ fishery operations. NSEDC operates an employment and training office in Unalakleet. This CDQ group currently receives 23 percent of the pollock and 18 percent of the Pacific cod CDQ allocations.

Yukon Delta Fisheries Development Association

YDFDA represents five communities. The group's emphasis has been on creating employment opportunities in the Bering Sea fishery through its mothership partner and through other pollock processors, both inshore and offshore. Another area of focus has been on a comprehensive training program that includes a combination trawl/pot/longline vessel and a 47-foot longline crab vessel. YDFDA has received steadily increasing CDQ pollock allocations and currently receives 14 percent of the pollock and 19 percent of the cod CDQ allocations. YDFDA faces the challenges of representing a region with few natural resources to develop, long distances to most viable fisheries, and relatively undeveloped human resources with respect to active participation in a commercial economy setting. While the group places residents in jobs with all three sectors,

it indicates that offshore and mothership employment are most useful for its residents. The group's CDQ royalties fund a variety of training activities encompassing technical and office skills.

3.9.4.3 Economic Impacts of the Community Development Quota Program

Revenue Generation

To be eligible to participate in the CDQ program, CDQ communities could have no current or historical linkage to the fisheries in question at the time of the program's implementation. Therefore, it has been necessary (with the exception of some of the halibut CDQs) for each CDQ group to enter into a relationship with one or more of the large commercial fishing companies that participate in the fishery. The CDQ community brings the asset of preferential access to the fish while the partnering firm brings the harvesting/processing capacity and experience in the fishery. The nature of these relationships differs from group to group. In every case, the CDQ community receives royalty payments on apportioned catch shares. Some of the agreements also provide for training and employment of CDQ community members within the partners' fishing operations, as well as other community development benefits. Each of the six groups negotiates a specific price per metric ton for the use of the apportioned CDQ shares, or a base price plus some form of profit sharing.

Based upon reports of consistently high bid-prices for CDQ shares (see, for example, testimony before NPFMC on the impacts of Inshore/Offshore III on the pollock CDQ program), the partnering companies also apparently receive substantial benefits from these CDQ relationships. These benefits may include preferred access to the resource, resulting in better yields and more valuable product forms (e.g., roe), and the more efficient use of capacity. The positive aspects of the CDQ pollock fishery probably contributed to the successful implementation of the offshore cooperative management system.

For the years 1992 through 1998, pollock CDQ royalties fluctuated between $17 million and $20 million per year (Figure 3.9-15). Royalty income rose substantially in 1999 and 2000 because both the TAC and lease price of pollock CDQ shares increased. Stronger overseas markets for groundfish products and a shift by processors to higher value products were among the reasons for the increase in CDQ lease values. In 2000, the CDQ groups received over $33 million in pollock CDQ royalties.

While pollock still dominates the program in terms of total royalties, royalties from the multi-species program provided an additional $7.3 million to the CDQ groups in 2000 (DCED 2001). Of the 2000 total of approximately $40.5 million for all species, pollock accounted for approximately 82 percent of all royalties, while all other species combined represented approximately 18 percent of total royalties. The percentage of the total 2000 royalties generated by each non-pollock species were as follows: Pacific cod - 8 percent; opilio crab - 5 percent; Bristol Bay red king crab - 3 percent; and other species, including sablefish, Atka mackerel, halibut and turbot - 2 percent. The non-pollock royalty proportions have changed somewhat in recent years, particularly with the BSAI crab fisheries phasing into the program beginning in 1998.

Asset Accumulation

The revenue stream from the lease of CDQ allocations has permitted the development of considerable savings within the CDQ groups. These savings provide important capital for making investments, and asset accumulation by CDQ communities is one empirical measure of the performance of the program. Amassment

of equity interest in real assets represents a clear community development strategy. Data suggest that CDQ groups, when taken as a whole, have retained almost half of their gross revenues in some form of equity, whether vessel ownership, processing facilities, marketable securities, loan portfolios, and IFQ holdings. The value of CDQ assets in aggregate increased from $1.5 million in 1992 to over $157 million in 2000 (DCED 2001).

Another benefit of capital asset acquisitions and venturing with industry participants is the enhanced control communities may exercise over the joint economic activity. As members in fishing companies with ownership interest, the CDQ groups are better able to take part in decisions that directly impact business operations and, thus, profitability. Also, the opportunity for technology transfer and hands-on experience (whether operational or managerial) occurs from the industry partner to the CDQ group. CDQ groups and their residents are able to learn first hand how the industry functions. This increases the likelihood of local control as CDQ residents, who have spent time learning from established industry partners, may one day be in control of their own operations and be able to operate independent of the CDQ program. In the interim, expanded employment opportunities, made available through vessel acquisition and partnering with established industry members, increase the sharing of benefits that accrue from the CDQ activities.

Increasingly, CDQ groups are using their CDQs to leverage capital investment in harvesting/processing capacity. Acquisition of ownership interest in commercial fishing operations and other fisheries-related enterprises is one important means of directly adding to a CDQ group's economic sustainability, consistent with the program's mandate. Current equity acquisitions in vessels are presented in Table 3.9-83. The table also specifies, if applicable, the catcher vessel class or catcher processor class in which each vessel has been included for the sector analysis.

All six CDQ groups have acquired ownership interests in the offshore pollock processing sector. In addition, APICDA and NSEDC have invested in inshore processing plants, some of which process groundfish (Table 3.9-84). These inshore plants include both shorebased and floating processing facilities.

In most of the processing ventures in which CDQ groups have invested, the groups are minority owners. However, the revenues derived from these investments may be substantial. An overview of the relative economic importance of investments in the offshore and inshore groundfish processing sector may be acquired by examining the historical quantity and value of groundfish processed by catcher processors and inshore plants in which CDQ groups currently have an equity interest (Table 3.9-85 and Table 3.9-86). The groundfish processed by these enterprises accounted for about 14 percent of the total tonnage and 15 percent of the total wholesale value of groundfish processed in the Alaska fishery in 1999 and 2000. Overall, it is estimated that the ownership shares of CDQ groups represents approximately 27 percent of the total groundfish revenues of these enterprises based on a weighted average of wholesale product revenue.

The most important component that CDQ groups bring into investments in the offshore groundfish processing sector is quota (DCED 2001). As shown in Table 3.9-85 and Table 3.9-86, CDQ catch accounts for a substantial portion of the total amount and value of groundfish processed by the companies in which the groups have invested.

The vessel list in Table 3.9-83 shows that CDQ groups have also invested in catcher vessels harvesting groundfish and other species. An overview of the relative economic importance of investments in these enterprises may be obtained by examining the historical quantity and value of groundfish caught by catcher

vessels in which CDQ groups currently have an equity interest (Table 3.9-87). The groundfish harvested by these fishing operations accounted for about two percent of the total tonnage and three percent of the total ex-vessel value of groundfish harvested in the Alaska fishery in 1999 and 2000. Overall, it is estimated that the ownership shares of CDQ groups represents approximately 50 percent of the total groundfish revenues of these enterprises based on a weighted average of ex-vessel revenue.

Employment and Income

At the time of the 1990 U.S. Census, all the communities in rural, western Alaska were experiencing relatively high levels of unemployment, ranging from 9 percent in the Bristol Bay area to 31 percent in the Yukon Delta area (DCED 2001). While these high unemployment rates partly reflect the seasonality of employment opportunities and the timing of the census in April, they also may show the effects of limited employment opportunities. All of the communities in the CDQ areas had median incomes that were lower than the state median income (DCED 2001). The median income of the Central Bering Sea area and the Bristol Bay area was less than ten percent below the state level, but in the Yukon Delta area and the Aleutian Pribilof area the median income was only slightly greater than half the state level (DCED 2001). The poverty rates in all the CDQ areas except the Central Bering Sea were at least twice the state rate of seven percent.

Employment opportunities have been one of the most tangible direct effects of the CDQ program for many western Alaska village residents. Indeed, the CDQ program has had some success in securing career track employment for many residents of qualifying communities, and has opened opportunities for non-CDQ Alaskan residents, as well. Jobs generated by the CDQ program included work aboard harvesting vessels, internships with the partner company or government agencies, work at processing plants, and administrative positions.

Table 3.9-88 summarizes the total annual CDQ employment and wages presented in quarterly reports. The CDQ program has created an excess of $8 million in wages annually since 1998. As shown in Table 3.9-88, non-pollock fisheries, although accounting for a relatively small proportion of total CDQ fisheries value or royalties, account for a significant majority (62.5 percent) of CDQ employment and almost half (47.6 percent) of total wages earned in 2000.

From 1993 through 2000, CDQ management and administration accounted for about 6 percent of the jobs and 24 percent of the wages. Pollock harvesting and processing accounted for 24 percent of the jobs and 26 percent of the wages. Other fisheries, which include halibut, salmon, sablefish, herring and crab related employment, accounted for 51 percent of the jobs and 34 percent of the wages. Finally, other employment, including internships, accounted for 18 percent of the jobs and 15 percent of the wages.

An overview of the relative impacts of the CDQ program may be gained by comparing income generated by the CDQ program with the total income in CDQ communities. Adjusted gross income data by zip code are available from the Internal Revenue Service for two years during the period that the CDQ program has existed - 1997 and 1998. The total adjusted gross income for all CDQ communities in these two years was $242,200,000 and $252,600,000, respectively. In addition, an estimate of adjusted gross income can be derived for 1999, the most recent year for which personal income data are available from the Regional Economic Information System of the U.S. Bureau of Economic Analysis for Alaska boroughs and census areas. In 1997 and 1998, adjusted gross income in CDQ communities was approximately 27.5 percent of the total personal income in the boroughs and census areas in which CDQ communities are located. Applying this

percent to the 1999 Regional Economic Information System personal income data yields an estimated adjusted gross income of $259,800,000 in CDQ communities for that year.

Table 3.9-89 shows CDQ wages in 1997 and 1998 as reported to DCED and total adjusted gross income for all CDQ communities as estimated above. CDQ-related income accounted for about 4.1 percent of the total income in CDQ communities by 1999.

While this analysis is based on the best information available, it yields only a rough approximation of the contribution of CDQ wages to regional income. As noted above, CDQ management and administration account for nearly one-fourth of CDQ wages. Many of the individuals in administrative positions work and reside in non-CDQ communities (Table 3.9-77). By including the wages of those individuals, this analysis overestimates the contribution of CDQ wages to the total income of CDQ communities. Some level of error may also have been introduced in the analysis because Internal Revenue Service income data are reported by zip code. The incomes of a number of small non-CDQ communities that share a zip cope with CDQ communities were included in the figure for total adjusted gross income. However, given the small size of the non-CDQ communities included, it is unlikely that the introduced error appreciably changed the analysis results. Similarly, the incomes of certain CDQ communities (Kongiganak, Napaskiak, Newtok and Oscarville) were omitted from the total adjusted gross income figure because their zip code overlapped with the relatively large non-CDQ community of Bethel. Again, the introduced error is likely insignificant due to the small size of the CDQ communities omitted.

Adjusted gross income data obtained from the Internal Revenue Service for 1997 and 1998 can also be used to examine the contribution of CDQ wages of each CDQ group (Table 3.9-90). Among the factors that account for the differences across groups is the presence or absence of communities with comparatively large populations and diverse economies. For example, the CDQ communities of King Salmon and Dillingham in the BBEDC region and Nome in the NSEDC region contributed about half of the total adjusted gross income for all CDQ communities in 1997 and 1998. The higher level of economic activity in these towns results in higher per capita incomes and reduces the relative importance of CDQ wages.

Indirect Employment and Income Effects

Some of the income earned in CDQ jobs, as well as spending for supplies and services in support of CDQ projects, passes through local merchants, service providers, and others before leaking out of the region in exchange for imports. The additional employment and income generated in this way is referred to as indirect economic impacts. In an area such as western Alaska, where very few goods and services are provided locally, money leaks out of the region relatively quickly. Nevertheless, every extra contribution to jobs and income helps, and these additional economic impacts of the CDQ program should not be overlooked.

Training and Education

Training of CDQ community residents has been a primary objective for all the CDQ groups from the outset of the program and has been promoted as an essential means to a sustainable locally based fishery economy. Each CDQ group provides training for their residents, based not only upon the individual needs of the trainee, but upon the overall needs of the community.

Training programs span the range of educational opportunities, from vocational and technical training, to support for higher education at college and university levels. CDQ groups have spent nearly $8 million directly on training expenditures involving over 7,000 residents since 1993 (DCED 2001). These investments are wholly dependent upon the revenues generated by the CDQ apportionments and, therefore, are another empirical measure of benefits deriving from the groundfish fisheries of the BSAI management area.

3.9.5 Subsistence

The subsistence use of natural resources by Alaska Native peoples represents a set of relationships to the local environment and a continuity of use that stretches back to prehistoric times, despite changes in technology and society. Subsistence activities are a central element of contemporary village life that often involve myriad social and cultural elements and whose importance ranges from being a basic component of physical sustenance to a part of relationships involved with a sense of group identity and individual feelings of well-being. Subsistence is also important to many of Alaska's non-Native residents, despite greater or lesser differences between groups in the specific cultural context of subsistence. For more than a few non-Native Alaska residents, a lifestyle that includes subsistence pursuits as a key element (or at least an opportunity) influences such basic life decisions as whether or not to move to, or remain in, rural Alaska. The importance of subsistence crosses social and cultural boundaries, and different subsistence pursuits may feel the impact of commercial use of the same or interrelated natural resources. As noted in the following subsections, the commercial groundfish fishery overlaps with a number subsistence related activities in a variety of ways.

3.9.5.1 Introduction

This section provides information on existing subsistence conditions relevant to the subsequent impact analysis of the proposed alternatives. This section is divided into three main discussions:

Regional Summaries of the Use of Groundfish and Other Subsistence Resources. These summaries provide information on current levels of the direct use of groundfish as a subsistence resource, as well as information on the current levels of use of other subsistence resources on a region-by region basis in order to put the use of groundfish into a broader subsistence context. In this manner, the importance of groundfish as a subsistence resource under existing conditions can be gauged both in absolute and relative terms (or engagement and dependence terms) to allow for subsequent analysis of potential impacts by alternative.

Subsistence Use of Steller Sea Lions. This discussion is specifically included due to the central role Steller sea lion population dynamics have played in recent groundfish fishery management strategies and are likely to continue to play under at least some future management approaches. Information is provided on differential use of Stellers by community and region. Steller sea lion subsistence is also presented as a stand-alone or special case consideration as different groundfish management approaches may have an impact on this subsistence resource that is likely different than other indirect subsistence impacts.

Other Relevant Subsistence Activities. This discussion focuses on subsistence activities other than groundfish and Steller sea lion subsistence that may or may not be subject to a range of impacts from the various groundfish fishery management approaches. These include subsistence salmon fisheries, and joint production opportunities. Subsistence salmon concerns span a wide geography in western and interior Alaska, while joint production issues are confined, by definition, to direct participants in the commercial groundfish fishery.

3.9.5.2 Regional Groundfish Subsistence Summaries

The following sections provide a region-by-region groundfish oriented summary of subsistence activity levels in each of the four Alaska regions analyzed. Groundfish subsistence occurs over a very large geographic area, but in general, subsistence groundfish use levels are low in comparison to use levels of subsistence resources overall, and in relation to other fish resources in particular. There is little, if any, indication that subsistence groundfish use is likely to experience direct impacts under any of the currently contemplated commercial groundfish fishery management alternatives, but there is a potential for joint production type of impacts where commercial and subsistence activities overlap. Given this set of circumstances, these summaries focus primarily on the regionally important groundfish communities identified in Section 3.9.3 and place the role of groundfish in the context of overall subsistence activities, including non-fishing related subsistence. The ability to differentiate between subsistence use of groundfish retained from commercial catches as opposed to the subsistence use of groundfish that were targeted for take during exclusively subsistence activities is not possible with the available data. In practical terms, however, this does not present difficulties analyzing the level and relative importance of groundfish subsistence use in general. In general, given the relatively low dependency on direct groundfish subsistence use, and the fact none of the alternatives would restrict subsistence groundfish take nor cause a decline in groundfish stocks, the potential impacts of any of the alternatives on subsistence uses of groundfish are not likely to be substantial. There is, however, variation between communities and regions and, as a result, localized effects will need to be considered. Within each of the summaries, the major species of groundfish within overall groundfish utilization are also specified, and this varies from community to community. (In the discussion in this section, as in other parts of this document, halibut and sablefish are not included as part of the "groundfish" category.)

The information presented in each of the regional summaries is extracted from the ADF&G Community Profile Database. The Community Profile Database is a compilation of the data collected by community surveys, primarily focused on wildlife harvest documentation, but also typically including associated demographic and economic information as well. Unfortunately, analysis of trends is largely not possible with these data. Community surveys are not conducted on a regular schedule, but rather are typically performed in relation to other ongoing studies or directed towards specific resource management questions. Thus, the time series information from some communities and for some resource categories is better than for others. For some communities only one survey is available, and such information can be quite dated. Furthermore, even for communities with multiple years of information available, the interpretation of the differences from year-to-year can be problematic. Since community subsistence activities and harvests vary each year, and surveys are not conducted annually or even within an overall temporal sampling design, the results from different years cannot simply be averaged. Where information for more than one year is available, ADF&G has addressed this problem by designating one year's results as "most representative" of the overall pattern of subsistence activities and level of harvest for that given community. This designation is based on ethnographic and other non-survey community context information. Where available, information on subsistence groundfish use from years that are not "most representative" are presented below. Where information from only one year is available, it is by definition the "most representative" year, but must only be used as an estimate given the amount of variation from year-to-year. This limitation is especially important for communities for which information is rather dated.

Subsistence in the Alaska Peninsula and Aleutian Islands Region

Subsistence resource use by residents of the regionally important groundfish communities of Unalaska, Akutan, Sand Point, and King Cove are is characterized in this section. All of these communities feature subsistence activity, with consumption ranging from about 200 pounds per capita to over 450 pounds per capita. Groundfish ranges from about 4 to 9 percent of total subsistence resource consumption.

Residents of Unalaska are reported to harvest and consume about 195 pounds of subsistence resource per capita, based on a 1994 survey of an estimated 700 year-round households, for a total ADF&G effective

population[21] of 1,825 individuals (ADF&G 2000). Of the subsistence total, 28 percent was salmon, 42 percent was non-salmon fish (of which various groundfish are a component), 5 percent was land mammals, 5 percent was marine mammals, one percent was birds and eggs, 14 percent was marine invertebrates, and 6 percent was vegetation. Groundfish average about 7 percent of the total per capita subsistence consumption (14 pounds per capita). The major contributors to this component are cod (8 pounds) and rockfish (5 pounds).

Residents of Akutan are reported to harvest and consume about 466 pounds of subsistence resource per capita, based on a 1990 survey[22] of an estimated 31 year-round households, for a total ADF&G effective population of 102 individuals (ADF&G 2000). Of the subsistence total, 26 percent was salmon, 31 percent was non-salmon fish (including groundfish), 6 percent was land mammals, 23 percent was marine mammals, 6 percent was birds and eggs, 6 percent was marine invertebrates, and 2 percent was vegetation. Groundfish average about 9 percent of the total per capita subsistence consumption (43 pounds per capita). The major contributors to this component are cod (29 pounds) and rockfish (11 pounds).

Residents of Sand Point are reported to harvest and consume about 256 pounds of subsistence resource per capita, based on a 1992 survey of an estimated 204 year-round households, for a total ADF&G effective population of 606 individuals (ADF&G 2000). Of the subsistence total, 54 percent was salmon, 21 percent was non-salmon fish (including groundfish), 11 percent was land mammals, 2 percent was marine mammals, 2 percent was birds and eggs, 7 percent was marine invertebrates, and 3 percent was vegetation. Groundfish average about 9 percent of the total per capita subsistence consumption (22 pounds per capita), most of which are cod (12 pounds) and rockfish (8 pounds).

Residents of King Cove are reported to harvest and consume about 256 pounds of subsistence resource per capita, based on a 1992 survey of an estimated 158 year-round households for a total ADF&G effective population of 560 individuals (ADF&G 2000). Of the subsistence total, 53 percent was salmon, 17 percent was non-salmon fish (including groundfish), 15 percent was land mammals, one percent was marine mammals, 4 percent was birds and eggs, 7 percent was marine invertebrates, and 3 percent was vegetation. Groundfish

[21] ADF&G calculates an "effective population" based on a unique determination of long-term residency that varies from typical community population counts. As a result, the ADF&G effective population for a given community will not normally correspond with either local or U.S. Bureau of the Census counts. For this reason, "effective population" figures are presented in the discussions in this section, and it should be borne in mind that per capita subsistence consumption figures presented represent total resources harvested divided among a population smaller than what are typically considered community residents (resulting in higher per capita figures than if standard total population figures were used). For the purposes of this analysis, per capita figures are perhaps most useful if they are conceived of as being applicable to those residents who are most likely to engage in subsistence production or consumption.

[22] More recent (1996) subsistence survey information for Akutan covers only bird and egg resources harvest levels.

average about 4 percent of the total per capita subsistence consumption (10 pounds per capita). The major contributors to this component are cod (6 pounds) and rockfish (2.5 pounds).

Subsistence in the Kodiak Island Region

As discussed in Section 3.9.3, the city of Kodiak itself is the single regionally important groundfish community. Subsistence in Kodiak may be characterized as follows:

Residents of the City of Kodiak are reported to harvest and consume about 151 pounds of subsistence resource per capita, based on a 1993 survey of an estimated 1,994 year-round households, for a total ADF&G effective population of 6,058 individuals (ADF&G 2000). Of the consumption total, 32 percent was salmon, 40 percent was non-salmon fish (including groundfish), 15 percent was land mammals, 6 percent was marine invertebrates, and 7 percent was vegetation. Groundfish average about 8 percent of the total per capita subsistence consumption (12 pounds per capita). The major contributors to this component are cod (4.8 pounds), rockfish (3.6 pounds), and greenling (2.4 pounds). For the three other years for which survey information is available (1982, 1991, and 1992) the annual groundfish subsistence harvest per capita ranged from 5 to 10.5 pounds, representing from 3.4 to 6.6 percent of the total per capita subsistence harvest for Kodiak during those years.

Subsistence in the Southcentral Alaska Region

Cordova, Homer, Nikiski, Seward and Anchorage are the regionally important groundfish communities in the South Central region, as discussed in Section 3.9.3. With the exception of Cordova, available subsistence data for groundfish for these communities show a much lower level of use than similar data show for the Aleutian and Kodiak Island regions.

Residents of Cordova are reported to harvest and consume about 179 pounds of subsistence resource per capita, based on a 1997 survey of an estimated 830 year-round households, for a total ADF&G effective population of 2,507 individuals (ADF&G 2000). Of the total of subsistence resources, 35 percent was salmon, 24 percent was non-salmon fish (including groundfish), 30 percent was land mammals, 2 percent was marine mammals, one percent was birds and eggs, 3 percent was marine invertebrates, and 5 percent was vegetation. Groundfish average about 4 percent of the total per capita subsistence consumption (7 pounds per capita). The major contributors to this component are rockfish (5 pounds) and cod (1 pound). For the five other years for which survey information is available (1985, 1988, 1991, 1992 and 1993) the groundfish subsistence harvest per capita ranged from 6.7 to 15.5 pounds, representing from 4 to 6.6 percent of the annual total per capita subsistence harvest in Cordova during those years.

Homer was designated by the Federal Subsistence Board as a “rural” community in May 2000. Prior to that time, Homer residents had not been federally qualified subsistence users and, as a result, no data were collected for many years leading up to the change in designation. The rural designation was also recent enough that no data have been collected since the community’s change in status. As a result, the only available information on Homer’s community subsistence use pattern is over 20 years old. Residents of Homer are reported to harvest and consume about 94 pounds of subsistence resource per capita, based on a 1982 survey of an estimated 1,798 year-round households, for a total ADF&G effective population of 5,633 individuals (ADF&G 2000). Of the total of subsistence resources, 21 percent was salmon, 32 percent was non-salmon fish (potentially including groundfish), 25 percent was land mammals, 2 percent was birds and

eggs, 18 percent was marine invertebrates, and 2 percent was vegetation. No groundfish were reported as part of the Homer subsistence harvest, but based on experience elsewhere, this probably reflects a relatively low level of harvest. This lack of reporting may be due to incidental take while targeting some other species, rather than no take whatsoever.

Similar to Homer, Nikiski had been classified as "non-rural" (non-subsistence) communities until the Federal Subsistence Board changed their classification in May 2000, when the board designated all communities on the Kenai Peninsula as "rural." The ADF&G subsistence does not contain any information for Nikiski, but does include some historical harvest information for nearby Kenai. The information for Kenai is summarized here as it is the information most likely to be indicative of the type of subsistence use that occurs in Nikiski. Residents of Kenai are reported to harvest and consume about 84 pounds of subsistence resource per capita, based on a 1993 survey of an estimated 2,274 year-round households, for a total ADF&G effective population of 6,372 individuals (ADF&G 2000). Of the total of subsistence resources, 46 percent was salmon, 19 percent was non-salmon fish (including groundfish), 20 percent was land mammals, one percent was marine mammals, one percent was birds and eggs, 6 percent was marine invertebrates, and 6 percent was vegetation. The amount of groundfish harvested was negligible (0.32 pounds per capita). Similarly, for the three other years for which survey information is available (1982, 1991, and 1992) the groundfish subsistence harvest per capita ranged from 0 to 0.7 pounds, representing from 0 to 1.0 percent of the total subsistence harvest during those years.

Seward cannot be described in terms of its residents' subsistence use patterns because there is no available information. Like Homer and Nikiski (and the other communities on the Kenai Peninsula), Seward was classified as a "non-rural" community until May 2000. Based on general community characteristics, Seward's pattern of subsistence resource use is likely similar to that seen in Homer, where groundfish subsistence use is negligible.

Anchorage cannot be described in terms of its residents' subsistence use patterns based on existing data because Anchorage is defined as a "non-rural" community and thus its residents are not federally qualified subsistence users. While there may be some minimal per capita groundfish take through sport fishing, this is considered negligible for this analysis.

Subsistence in the Southeast Alaska Region

Petersburg, Sitka, and Yakutat are the regionally important groundfish communities in this region, as described in Section 3.9.3. Total subsistence resource consumption ranges between about 200 and 400 pounds per capita in these communities, with groundfish ranging between 1 and 5 percent of the total annual consumption.

Residents of Petersburg are reported to harvest and consume about 198 pounds of subsistence resource per capita, based on a 1987 survey of an estimated 1,123 year-round households, for a total ADF&G effective population of 3,739 individuals (ADF&G 2000). Of the subsistence resource total, 23 percent was salmon, 22 percent was non-salmon fish (including groundfish), 29 percent was land mammals, 2 percent was birds and eggs, 19 percent was marine invertebrates, and 4 percent was vegetation. Groundfish average about 2 percent of the total per capita subsistence consumption (3.5 pounds per capita), most of which are cod and rockfish.

Residents of Sitka are reported to harvest and consume about 205 pounds of subsistence resource per capita, based on a 1996 survey of an estimated 3,053 year-round households, for a total ADF&G effective population of 8,535 individuals (ADF&G 2000). Of the subsistence resource total, 28 percent was salmon, 26 percent was non-salmon fish (including groundfish), 25 percent was land mammals, 4 percent was marine mammals, 13 percent was marine invertebrates, and 3 percent was vegetation. Groundfish average about 5 percent of the total per capita subsistence consumption (9.9 pounds per capita). The major contributors to this component are rockfish (5 pounds) and greenling (3 pounds). Similarly, for the only other year for which a survey was conducted (1987), subsistence groundfish were about 6 percent (8.7 pounds per capita) of the total subsistence harvest.

Residents of Yakutat are reported to harvest and consume about 398 pounds of subsistence resources per capita, based on a 1987 survey of an estimated 169 year-round households, for a total ADF&G effective population of 589 individuals (ADF&G 2000). Of the subsistence resource total, 54 percent was salmon, 19 percent was non-salmon fish (including groundfish), 4 percent was land mammals, 8 percent was marine mammals, one percent was birds and eggs, 10 percent was marine invertebrates, and 4 percent was vegetation. Groundfish average about one percent of the total per capita subsistence consumption (5 pounds per capita). The major contributors to this component are flounder (2.5 pounds), cod (1.5 pounds), and rockfish (1 pound). For the only other year for which a community survey was conducted (1984), subsistence groundfish comprised about 3.5 percent (12.7 pounds per capita) of the total subsistence harvest, most of which were greenling (4.1 pounds), rockfish (3.2 pounds), flounder (3.1 pounds), and cod (2.1 pounds).

3.9.5.3 Subsistence Use of Steller Sea Lions

This section presents information on the subsistence harvest and consumption of Steller sea lions in Alaska by region and community for recent years. As discussed in previous sections of this Programmatic SEIS, a number of Alaska groundfish management actions have in recent years been linked to the interrelationship of groundfish and Steller sea lion populations. Because of this focus, this section examines subsistence use of Steller sea lions by community and region, including information on relative dependency on Stellers among other subsistence resources where data permit, and discusses the relationship of subsistence activities to the Steller sea lion population dynamics.

It should be noted that most of the documented harvest information is for years when Steller sea lions were classified as "threatened," before the western stock of Steller sea lions was reclassified in 1997 as "endangered." How this official change in status per se has influenced subsistence take, if at all, is unknown. Further, it is also important to note that while subsistence use of other resources is open to a broader spectrum of residents of coastal Alaskan communities, the take of marine mammals is restricted to the Alaska Native portion of the population under the terms of the MMPA of 1972 (as reauthorized in 1994 and amended through 1997; the specific subsistence exemption for Alaska Natives is found in Section 101 [16 USC 1371]). Therefore, any subsistence impacts to Stellar sea lions would be concentrated among Alaska Native residents of these communities.

Steller Sea Lion Subsistence Methods

Steller sea lions are taken by a number of methods throughout the year. Unlike a number of other subsistence activities that are more broadly participatory, hunting for sea lions is a relatively specialized activity, and a relatively small core of highly productive hunters from a limited number of households account for most of

the harvest. For the years surveyed, individuals from only 20 to 29 percent of all households in the relevant communities actually hunted sea lion (ADF&G 2001a). Once harvested, sea lion is distributed among a much wider range of households (ADF&G 1999, 2001a).

There has been some change in harvesting techniques over recent years, and there is also variation by region. For Kodiak Island communities, the sea lion harvest used to take place at their haulouts, and 20 or 30 were transported at a time aboard purse seiners. Thus, one or two hunters could supply an entire village. Currently, hunting sea lions involves two or three individuals using skiffs to hunt swimming sea lions in open water. The hauling capacity of such skiffs is one or two animals, and Kodiak hunters prefer to take young adults of medium size rather than large bulls or young pups. Some sea lions are taken from shore locations where sea lions are known to swim close to the shoreline. The animal is then retrieved using a skiff. Peak months for harvest are October through December (ADF&G 1991).

Hunting methods vary somewhat in the Aleutians and Pribilof Islands and are documented in ADF&G (1995). Pribilof Island residents hunt sea lions almost exclusively from the shore and target swimming juvenile (mid-size) males. On St. Paul Island sea lion hunting is most commonly done from shore at Northeast Point, accessible by truck. St. Paul hunters take advantage of known sea lion "swimways." Once shot, the hunter waits for the wind and sea to bring the carcass to shore, as heavy seas generally preclude the use of a skiff. A "sea dog" (a retrieval device consisting of a piece of wood with hooks attached to a 30- to 40-foot rope) assists in this process. Not all animals are recovered, but hunters try to shoot only those animals for which there is a high probability of eventual recovery. Hunters will at times hunt from skiffs in calm weather. Sea lion hunting on St. Paul occurs mainly from September through May. Sea lion hunting on St. George is similar to that of St. Paul, being predominately shore-based. Harvest occurs mainly from January through May. Sea lion harvest in the Aleutian Chain (Atka, Unalaska, Akutan, and Nikolski) occurs mostly from skiffs in open water, and hunters target both sexes. When skiff travel is risky or for a change of pace, sea lion hunting is also done from concealed shore stations. Aleutian Chain hunters will concentrate effort near haulout locations, and take more adult and female animals than do Pribilof Island hunters. Seasonality of sea lion harvest is quite variable, and appears to be dependent on sea lion abundance and distribution.

Harvest Levels and Regional Variation

Historical documented subsistence harvests of Steller sea lions are presented in Tables 3.9-91 through 3.9-94. These figures represent both recovered and "struck and lost" animals.

Table 3.9-91 presents information derived from ADF&G surveys of all subsistence resources harvested by a given community plus the specific Steller sea lion harvest. Together, these two types of information allow for an assessment of the relative dependency of a community on Steller sea lions within the overall subsistence harvest. A major caveat for the information contained in this table is that each community was surveyed only a limited number of times and for different years than most other communities, meaning comparability between communities is limited. It is also important to note that the documented Steller sea lion percentage of total subsistence harvest shown in the table is a measure of the past use and reliance upon this resource, and almost certainly does not represent the current harvest, which generally is assumed to be much lower than that in the past. For Atka, Akutan, St. George, and St. Paul (and perhaps Unalaska and several other communities) it can be seen that Steller sea lions have in the past represented a very significant subsistence resource in terms of relative contribution to overall community subsistence resource consumption. It should also be clearly noted that the information in Table 3.9-91 is not totally consistent with the

information presented in Tables 3.9-92 through 3.9-94, which underscore the general lack of precision in the data. What is evident, however, is that the area of heaviest subsistence use of Steller sea lions is in southwestern Alaska, and is concentrated in relatively few communities.

Tables 3.9-92 through 3.9-94 present information from surveys documenting only sea lion (and harbor seal) subsistence harvest in all Alaskan communities for the period 1992 (the first year of focused surveys on sea lion and harbor seal harvests) through 2000, except for 1999, when no survey was conducted (due to lack of funding). (Subsequent information was collected for 2001, but is not available at the time of this writing.) Nine communities surveyed in previous years could not be included in the 2000 survey, however, as local surveyors could not be secured. For these communities (Anchorage, Atka, Homer, Hydaburg, Kenai, Nikolski, St. George, Tyonek, and Valdez), ADF&G estimated that the sea lion harvest in 2000 was the same as in 1998 (the most recent year for which harvest information was available). In addition, the 2000 harvest survey for a tenth community, St. Paul, was conducted independently by a local hunter association with funding from NOAA Fisheries. The results of this project were not available at the time of publication of ADF&G 2001a, so estimates from 1998 were also used to represent the year 2000 sea lion harvest for this community in the ADF&G data set. As a result, caution must be taken in the interpretation of 2000 harvest data.

Of the 206 sea lions shown in Table 3.9-92 as "taken" in 2000, over half (104) are attributed to those communities assumed to have harvested the same number of sea lions in 2000 as in 1998 (Atka 17, Nikolski 1, St. George 20, St. Paul 58, and Valdez 8). All other communities were documented to have harvested 102 sea lions in 2000, while in 1998 these same communities harvested a total of 75 sea lions (an overall increase in harvest for 2000, primarily in Unalaska, compensating for a steep decline in Tatitlek). However, the independent St. Paul harvest project estimated that only 23 sea lions were taken in St. Paul during 2000 (Lestenkof and Zavadil 2001), 35 fewer than assumed by ADF&G 2001a, so it is unclear whether actual totals for 2000 would have been higher or lower than the projected totals that appear in the tables. It is reasonable to assume, however, that the overall or longer term trend of decline in total harvest has continued in more recent years in parallel with the overall sea lion population decline, but year-to-year harvest in individual communities is considerably more variable (for example, Unalaska and Tatitlek). The reasons for such community variability are most likely related to local sea lion populations, hunting conditions, hunter characteristics, and the community context (ADF&G 1999, 2001a).

Table 3.9-93 provides break-out information by community for the Aleutian/Pribilof region for the period 1992-2000, while Table 3.9-94 provides similar information for communities in the combined Kodiak-Southcentral region. As shown, in years between 1992 and 2000, Atka, St. George, St. Paul, and Unalaska dominate subsistence take of Steller sea lions in the Aleutian/Pribilof region. Similarly, while there is a great deal of variation from year-to-year in the Kodiak-South Central area, the dominance of Old Harbor in most years is also clear.

Steller Sea Lion Populations and Subsistence Efforts

ADF&G has tried to address the possible linkage between the decline in the overall Steller sea lion harvest and a decrease in the sea lion subsistence harvest effort between 1992 and 1998 (ADF&G 1997a, 1998, 1999, 2001a). They note that while the total number of sea lions harvested for subsistence use has decreased, interpretation of this change is not straightforward. A number of factors could be at work. For example, take of sea lions has decreased at the same time that the number of people hunting sea lions has decreased. One

possibility is that take is down simply because fewer people are hunting. While it is not clear that the annual average harvest per hunter has declined (although ADF&G has not investigated this in a rigorous manner), it is likely that declining Steller sea lion populations play a role in the decisions people make regarding whether to hunt or not. ADF&G states:

> *"... there are probably a variety of local factors related to the year-to-year changes in the number of households hunting sea lions in particular communities, including seasonal hunting conditions, local food needs, and personal circumstances of hunters. It is likely that the declines in the numbers of sea lion hunters in many communities are because sea lions are increasingly harder to find and consequently more difficult and expensive to hunt. As sea lions become scarcer in a community's hunting area, an increasing number of hunters in the community probably choose to stop hunting them. While the hunters that continue to hunt appear to maintain annual harvest rates similar to past years, hunters probably are investing more time and money in pursuit of the sea lions harvest. In addition to these factors, it is quite likely that some sea lion hunters have chosen to reduce their hunting activity because of perceived problems with sea lion populations" (ADF&G 1999:69, and essentially repeated in ADF&G 2001a:77).*

In earlier documents, ADF&G had also suggested that another factor in the decrease of sea lion subsistence take may be the increased availability of seasonal wage employment in local communities (presumably including work in the groundfish fisheries). Some hunters may be choosing to work rather than to hunt, as a conscious economic choice of time allocation (ADF&G 1997a, 1998). This explanation is not stressed as much in their 1999 report, being included in the phrase "… personal circumstances of hunters" (ADF&G 1999:69). It should be noted that hunting Steller sea lions requires a considerable amount of effort, and in most cases the cooperation of several people, so that time management and allocation could be a significant factor. An additional possible contribution to a decrease in sea lion subsistence harvest could be a cultural change in taste, so that the consumptive demand for sea lion may have decreased over time (for example, younger generations, less exposed to regular consumption of sea lions, may not desire sea lion as a foodstuff as much as elders do). While this was mentioned anecdotally during field research conducted for this project, no systematic information exists on this possible factor.

While the available information suggests some support for a direct relationship between the overall Steller sea lion population and the level of subsistence harvest, such support is not definitive and other factors cannot be excluded. Given the relatively small numbers involved, the concentrated efforts of a single hunter or just a few hunters can make relatively large percentage changes in community harvest totals. The weighting of factors is also not possible from the evidence available. It does appear that present Steller sea lion harvest methods are likely to be more successful, and certainly more efficient, when resource populations (and density) are higher. A number of factors may be at work, however, such that a recovery in Steller sea lion abundance may not necessarily result in a marked increase in subsistence take, but too little is known regarding the determinants of subsistence demand for Steller sea lions to reach any definitive conclusions.

3.9.5.4 Other Relevant Subsistence Activities

The communities of the Bering Sea and GOA regions engage in a wide range of subsistence activities other than direct groundfish and Steller sea lion use that may be directly or indirectly affected by the proposed alternatives. These activities include subsistence salmon fishing (which could potentially be affected by salmon bycatch in the groundfish fishery) as well as a wide range of subsistence activities that are facilitated

by engagement in the groundfish fishery. Some subsistence activities are facilitated by engagement in the groundfish fishery either through joint production (using commercial groundfish vessels or gear for subsistence) or by applying income derived from the commercial fishery towards subsistence pursuits. While characterization of existing conditions for the entire range of subsistence activities that could be indirectly affected by the alternatives is not practical for inclusion in this document, information on subsistence salmon fisheries and a general level discussion on joint production opportunities are summarized in this section.

Subsistence Salmon Fisheries

Current Alaska groundfish fishery management includes provisions for the minimization of salmon bycatch, but salmon bycatch has remained a concern, particularly with respect to potential ongoing impacts to subsistence salmon fisheries. This issue has also been repeatedly noted in the public comment process for this Programmatic SEIS.

Overview

The following information on historic and current subsistence salmon harvest are summarized from the Alaska Department of Fish and Game, Subsistence Division "Alaska Subsistence Fisheries 1999 Annual Report." This is the latest year for which data were available at the time of this writing (December, 2002). In 1999, fisheries in four management areas accounted for 77 percent of the total subsistence salmon harvest statewide. These were Yukon (232,070 salmon; 25 percent of the statewide total); Kuskokwim (202,413 salmon; 21 percent); Northwest Alaska (154,294 salmon; 16 percent); and Bristol Bay (143,756 salmon; 15 percent). The total estimated salmon subsistence harvest in Alaska in 1999 was 975,617 fish based on annual harvest assessment programs.

The species of most concern as bycatch in the groundfish fishery are chinook and chum, and of these two, chinook is considered a much larger potential problem. The largest subsistence harvests of chinook salmon in 1999 occurred in the Kuskokwim Area (77,660 salmon; 50 percent), followed by Yukon (50,515 salmon; 33 percent), Bristol Bay (13,009 salmon; 8 percent); and Northwest (6,242 salmon; 4 percent). Three areas dominated the subsistence chum salmon harvest in 1999: Yukon (162,670 salmon; 48 percent of the statewide harvest), Northwest (115,676 salmon; 34 percent), and Kuskokwim (47,612 salmon; 14 percent).

Given the dominance of the Yukon and Kuskokwim areas in total subsistence salmon harvest, and particularly in chinook harvests, those areas are profiled in overview in this section in order to illustrate the extensive geography of the fishery and the number of communities and households involved.

Yukon Region

In historic times as well as today, residents of the Yukon River area rely heavily upon fish for food, and salmon comprises the bulk of the total subsistence fish harvested. Although four salmon species are harvested in the Yukon drainage subsistence fishery, chinook, chum and coho salmon comprise the majority of the subsistence harvests, with subsistence harvests often far exceeding commercial harvests. Depending on the area of the drainage, subsistence fishing occurs from late May through early October. Fishing activities are either based from a fish camp or from the home village. Fishing patterns and preferred sites vary from community to community. Extended family groups, typically representing several households, often undertake

subsistence salmon fishing and typically cooperate to harvest, process, preserve, and store salmon for subsistence use.

Chinook salmon are harvested and processed primarily for human consumption, although small kings and those fish deemed not suitable for human consumption are often fed to dogs. In addition, while chum and coho salmon are primarily taken for human consumption, relatively large numbers are harvested and processed to feed sled dogs. The practice of keeping sled dogs is more common in communities along the Upper Yukon River.

In 1999, it is estimated that 2,888 households in the Yukon region participated in the fishery (Table 3.9-95). The estimated 1999 total subsistence salmon harvest for the Yukon area broken down by species included 50,515 chinook (22 percent), 79,250 summer chum (34 percent), 83,420 fall chum (35 percent), 19,984 coho (9 percent), and 681 pink salmon (0.3 percent).

The estimated 50,515 chinook salmon harvested for subsistence in the Yukon Area in 1999 was near the recent five-year average of 51,609. These chinook accounted for approximately 22 percent of the total subsistence catch in the Yukon Area in 1999 (Figure 3.9-16). However, the estimated 1999 summer chum subsistence harvest of 79,250 was about 27 percent below the recent five-year average of 108,051 (Table 3.9-96). The 1999 estimated subsistence harvest of fall chum of 83,420 was about 17 percent below the recent five-year average. However, the five-year average includes harvests from 1995 to 1998, when regulatory restrictions were imposed to reduce fishing opportunity for fall chum subsistence. (A similar restriction was in place in 1994.) A comparison with years in which restrictions were not imposed suggests that the 1999 fall chum harvest is approximately 41 percent below the 1989 to 1993 five-year average (a period with more typical harvests).

Kuskokwim Area

The harvest of fish and wildlife for subsistence use is an important component of the mixed subsistence-cash economy throughout the Kuskokwim Area. During summer, early June through August, the day-to-day activities of many Kuskokwim Area households revolve around the harvesting, processing, and preserving of salmon for subsistence use. The seasonal movement of families from permanent winter communities to summer fish camps situated along rivers and sloughs, continues to be a significant element of the annual subsistence harvest effort. ADF&G Division of Subsistence studies in the region indicate that fish contribute as much as 85 percent of the total pounds of fish and wildlife harvested in a community annually, and salmon as much as 53 percent of the total annual harvest (Coffing 1991).

Approximately 1,700 households in the region annually harvest salmon for subsistence use. Many other households, which are not directly involved in catching salmon, participate by assisting family and friends with cutting, drying, smoking, and associated preservation activities (salting, canning and freezing). Subsistence catches of chinook salmon in the Kuskokwim Area exceed the commercial catch of this species.

There are 37 communities consisting of approximately 4,200 households with subsistence permits within the Kuskokwim Area (Table 3.9-97). The majority of the area households (3,059) are situated within the drainage of the Kuskokwim River. Bethel is the largest community in the region, containing approximately 1,508 households. Approximately 342 households are located in the northern Kuskokwim Bay communities of Kwigillingok, Kongiganak and Kipnuk. Residents of these three communities harvest subsistence salmon from

the Kuskokwim River as well as from areas closer to the communities. Residents of Quinhagak, Goodnews Bay, and Platinum, located along the south shore of Kuskokwim bay, harvest salmon stocks primarily from the Kanektok, Arolik, and Goodnews River systems. Residents of Mekoryuk, Toksook Bay, Nightmute, Tununak, Newtok, and Chefornak, situated near the Bering Sea Coast, also harvest salmon from coastal waters as well as local tributaries.

The 1999 total subsistence salmon harvest estimates for the Kuskokwim Area was 77,660 chinook, 47,612 chum, 49,388 sockeye, and 27,753 coho salmon. Seventy-six percent of the overall subsistence salmon harvests in the Kuskokwim Area were taken by residents of communities located from Tuluksak downstream to Eek.

Chinook salmon are particularly sought after for subsistence use in the Kuskokwim Area and account for a large percentage (38 percent) of the total subsistence salmon catch (Figure 3.9-17). The 1999 subsistence chinook harvest was about 9 percent below the 1995-1999 average of 86,208 fish. The estimated sockeye harvest during 1999 (49,388 fish) was the highest it has been since 1993 (Table 3.9-98). The 1999 harvest was also 28 percent greater than the 1995 through 1999 harvest average of 38,379. Subsistence harvests of both coho and chum salmon have both experienced a general decline since 1989. The estimated harvest of 27,753 coho salmon in 1999 is 13 percent below the average harvest of 31,914 fish from 1995 through 1999. The harvest of 47,612 chum salmon during 1999 was the second lowest catch since 1985. The average harvest of chum salmon from 1995 through 1999 is 63,087 fish. Only in 1997 was the chum harvest lower.

On occasion, commercial fishers sometimes keep salmon caught during a commercial fishing period and take them home for subsistence use. During 1999, approximately 11 percent of the households which reported commercial fishing also reported that they kept salmon from their commercial catch for subsistence use. A total of 105 chinook salmon, 37 chum, 106 sockeye, and 140 coho salmon were reportedly retained from the commercial catch for subsistence use. The number of salmon retained from commercial fishing activities for subsistence use is usually relatively low. The lack of commercial fishing opportunities in 1999 is partly responsible for the low numbers retained.

Salmon Bycatch Under Groundfish Fishery Existing Conditions

As detailed in the salmon prohibited species discussion (Section 3.5.2.2), the five species of Pacific salmon are divided into two FMP management groups: chinook salmon, and "other" salmon (chum, sockeye, coho, pink). (Steelhead trout have not been observed recently in either the BSAI or GOA and were not considered in that assessment.) All groundfish fisheries in the BSAI and GOA are prohibited from retaining any species of salmon except for those retained under the Voluntary Salmon Donations Permit that authorizes their retention for local food banks (BSAI Amendment 26, GOA Amendment 29). In 1999, over 3 million pounds were donated. Of the five salmon species, only the bycatch of chinook and chum salmon are of any serious concern in the BSAI and GOA. Pink, coho, and sockeye salmon populations in Alaska are considered healthy and bycatch in the groundfish fisheries represents only a minuscule portion of state harvests. These three species also are small components of bycatch in the groundfish fishery relative to chinook and chum salmon.

As detailed in Section 3.5.2.2, although the overall bycatch of chinook and chum salmon is also very small relative to state harvests, bycatch take could pose a threat to specific stocks (rivers of origin). Some western stocks of chinook salmon are currently depressed. In 2000, there were fishing closures in the Yukon and Kuskokwim river systems and it is possible that ADF&G escapement goals may not be realized over the

immediate future. If individual stocks become so depressed that full closure of direct fisheries is insufficient to enable a rebound in the population, then any additional mortality, including bycatch, could negatively impact the stock. It is estimated that 58-70 percent of chinook salmon bycatch in the BSAI groundfish fisheries may originate from western Alaska stocks, but it is unknown what proportion of these salmon are specifically from depressed stocks. Analysts contend that there is insufficient information to determine the effects of BSAI bycatch and PSC limits on specific at-risk stocks within this western group.

As summarized in Appendix C, under BSAI Amendment 21b, the PSC limit represents about 19.2 to 36.9 percent of the combined Arctic-Yukon-Kuskokwim and Bristol Bay chinook salmon landings reported between 1997 and 1999. This is a substantial portion of the domestic harvest. In 1999, NPFMC adopted BSAI Amendment 58 which will (1) further reduce the chinook salmon bycatch limit from 48,000 to 29,000 fish over a four-year period, (2) implement year-round accounting of chinook salmon bycatch in the pollock fishery, (3) revise the boundaries of the Chinook Salmon Savings Areas, and (4) set more restrictive closure dates. This reduced PSC limit represents about 11.6 to 22.3 percent of the combined Arctic-Yukon-Kuskokwim and Bristol Bay chinook salmon landings reported between 1997 and 1999. PSC limits have not been established for salmon in the GOA, nor is bycatch considered a potential problem for subsistence fisheries under existing conditions. Some western Alaska stocks of chum salmon are also depressed, but analysts estimate that only about 19 percent of chum salmon bycatch in the BSAI is from western stocks. Because this is equivalent to only 1.3 to 1.5 percent of the combined Arctic-Yukon-Kuskokwim and Bristol Bay chum salmon landings reported between 1997 and 1999, bycatch represents a tiny fraction of landings even for depressed stocks.

A recent paper by Witherell *et al.* provides a compilation of the latest data on Alaska groundfish fisheries salmon bycatch under existing conditions:

> Chinook salmon *Oncorhynchus tshawytscha* and chum salmon *O. keta* are caught incidentally in Alaska groundfish fisheries, primarily in the walleye pollock *Theragra chalcogramma* trawl fishery. From 1990-2001, an average of 37,819 chinook salmon and 69,332 other salmon species (>95 percent are chum salmon) were incidentally caught annually in the Bering Sea and Aleutian Islands groundfish trawl fisheries, and 20,799 chinook salmon and 20,496 other salmon [> 95 percent are chum salmon] were incidentally caught annually in the GOA trawl fisheries. . . Bycatch is primarily juvenile salmon that are one or two years away from returning to the river of origin as adults. The origin of salmon taken as bycatch includes rivers in western Alaska, Southcentral and Southeast Alaska, Asia, British Columbia, and Washington. Analysis indicates that an incidental catch of 30,000 chinook salmon in the Bering Sea and Aleutian Islands groundfish trawl fisheries equates to about 14,581 adult chinook salmon from western Alaska. Similarly, a bycatch of 60,000 chum salmon in the Bering Sea and Aleutian Islands groundfish trawl fisheries equates to about 13,120 adult chum salmon from western Alaska. We estimated that, on average, salmon bycatch in the Bering Sea and Aleutian Islands groundfish trawl fisheries reduced the western Alaska chum salmon run by less than 0.2 percent, and reduced the western Alaska chinook salmon run by less than 2.7 percent. Impacts of salmon bycatch from the GOA groundfish trawl fisheries cannot be estimated at this time (Witherell *et al.* 2002).

Although the numbers of salmon bycatch and associated impacts of western Alaska stocks would appear relatively low, salmon bycatch is nonetheless a contentious issue given the current state of some of the salmon fisheries. For example, in 2000, “salmon returns throughout the Yukon and Kuskokwim River drainages and

the entirety of Norton Sound were less than 50 percent of the 20-year average" (D. Eggers, ADF&G Juneau, personal communication, cited in Witherell *et al.* 2002). These, and correspondingly adverse conditions in the Bristol Bay sockeye fishery, have led to constraints on commercial, recreational, and subsistence harvests, and in 1998, 1999, and 2000, an economic disaster was formally declared for western Alaska based on collapsed salmon runs (Witherell *et al.* 2002). While year-to-year fluctuations are common (and are more so in the GOA than in BSAI fisheries), in recent years chum salmon bycatch in the BSAI has remained fairly stable. However, BSAI chinook bycatch increased in 2001 to about 7 percent over the 1990-2001 annual average (Witherell *et al.* 2002). Given the existing conditions in the salmon fisheries, and the specific importance of salmon to overall subsistence take, the cause of public concern over salmon bycatch in the Alaska groundfish fisheries, even in low numbers, is readily apparent.

Commercial Groundfish Fishing and Subsistence Joint Production Opportunities

"Joint production" refers to the use of commercial fishing vessels and/or gear in the pursuit of subsistence. Joint production can occur in at least two fundamentally different ways. Subsistence fish can be retained during what are otherwise commercial trips, or separate trips (using the commercial vessel and gear) may be taken that focus on subsistence.

In general, there is a paucity of information on joint production within the groundfish fishery. Below are some general points about the vessels involved, followed by points about the communities involved.

- Some, but not all, vessels in the commercial groundfish fishery are used for subsistence in addition to commercial fishing.

- Depending on the community involved, a greater or lesser proportion of fleet engaged in the local commercial groundfish fishery is a non-resident fleet.

As a general rule, trips specifically dedicated to subsistence are uneconomic for the larger vessels engaged in the groundfish fishery. Larger vessels also tend to fish more away from the community of residence of owner, skipper, and crew, therefore subsistence use is not practical even during what could otherwise be combined commercial/subsistence trips. For the largest vessels participating in the fishery, there is no indication of any subsistence utilization in any form. (For the large vessels that are based in communities where subsistence does take place, dedicated subsistence trips for fishing may be unusual, but it is known from field interviews that sometimes larger vessels are used to make hunting trips with several persons going at once.)

Smaller vessels are most likely to be involved in joint production. The proportion of the total subsistence production for individual communities that result from joint production from these particular vessels during the groundfish fishery is unknown, but as a general rule of thumb, the smaller vessel classes are less likely to be narrowly specialized than the larger vessels. Nearly all of the smaller class vessels that engage in the groundfish fishery are also involved in some combination of (or all of) the salmon, halibut, sablefish, and herring fisheries.

In practical terms, joint production opportunities vary by gear type as well as vessel size. Although quantitative data are slim, knowledge of the industry would suggest that little subsistence takes place using trawl vessels compared to other gear types. Among the fixed gear classes, much more time is directed toward

sablefish, salmon, and herring than is devoted to groundfish, therefore the joint production opportunities in this class would remain relatively high independent of the groundfish management alternative chosen.

Commercial vessel owners and crew are not restricted to use of commercial vessels and gear, and in practice the use of specific platforms appears to be fluid. Field observations and discussions would indicate that almost all commercial vessel owners resident in communities where subsistence takes place also own at least one skiff from which they can engage in subsistence pursuits, so even if the larger commercial vessel is not available for any number of reasons, it will not mean the discontinuation of subsistence efforts. Even if a commercial vessel owner does not individually own a skiff, it is a truism of village life that there will always be other vessels owned by sons, fathers, brothers, other kin, or neighbors. It is also important to note that if commercial fishing time goes down (or even joint production opportunities per se), it is entirely possible that subsistence activities will increase, because the relative importance of subsistence in the household economy (e.g., supplying food for the table) will increase, as long as fuel and necessary gear can be obtained.

Short and long term variation in joint production is not uncommon. Field observations would indicate that different individuals look at the balance between commercial and subsistence catches during times of resource scarcity or other forced decision-making (such as when the price being paid for fish by processors is especially low) in very different ways. From one point of view, if the fishing is poor because few fish are available, the vessel owner should direct effort to the greatest extent possible toward the commercial catch in order to get at least some economic return out of a scarce resource for the family or household economy. From another point of view, if conditions are bad, subsistence fishing should be accomplished first, because subsistence takes care of the basic need to put food on the table in the most direct way possible. Clearly both points of view are held, and both strategies are pursued by different individuals, and this is illustrative of another dimension of the complex relationship between commercial and subsistence pursuits. Poor market conditions also force tough decisions, and different decisions may be influenced by a threshold effect after an individual operation is able to recoup expenses. Again, there are many factors at work in this dynamic decision-making environment and, as a result, similar conditions may result in different outcomes for individual operations, and individual operations may show considerable variability over time.

CDQ-owned vessels that participate in the groundfish fishery largely do not participate in subsistence activities. Although CDQ communities in general have relatively high levels of subsistence engagement, CDQ owned vessels participating in the groundfish fishery may not be based in those communities (i.e., they are an investment that is not directly run out of one of the communities, as is the case for ownership interest in catcher processors). Other CDQ-owned vessels do not participate in the groundfish fishery (or those portions of the groundfish fishery that could change as a result of the alternatives) at all, or at only very low levels. For example, some CDQ owned vessels concentrate nearly exclusively on the salmon fishery, while others focus on halibut and sablefish. (A more detailed discussion of CDQ-owned fleet characteristics is provided in Section 3.9.4).

As noted earlier, factors involved in whether or not individuals engage in subsistence pursuits are multiple and complex, and this applies to vessels as well. Some data from ADF&G (and mentioned in the Steller sea lion discussion above) suggest that in at least some instances, level of engagement in subsistence activities declines when individuals are engaged in commercial pursuits. Therefore it may be the case for at least some individuals that if their commercial groundfishing activity declines, their direct participation in subsistence activities may increase. Field interviews and other studies (Kruse *et al.* 1981, Kruse 1982, Schroeder *et al.* 1987) suggest that in other cases, individuals who are the most economically successful in a given community

are often also among the highest subsistence producers.[23] This likely results from these individuals having access to more income to purchase better or more efficient equipment (and to be able to afford to engage in activities that require cash outlay for longer periods of time), and the flexibility of schedule that often comes with higher paying employment, among other individual or personal factors. In sum, the factors leading to subsistence participation are many and complex.

There is considerable variation in joint production opportunities by community and region under existing conditions. In the case of Unalaska, none of the large commercial vessels that deliver groundfish to the local processing plants are owned or crewed by residents of the community. There is a small boat fleet from the community that jigs for cod, although the most recent data available suggest that none or very few jig boat owners derive their income exclusively from commercial fishing. The fact that commercial fishing for small boat owners is generally one part of a (variable) multiple income source strategy of piecing together a living suggests that even when there is a partial reduction in opportunity to fish, there are still incentives to continue to fish. In terms of the number of participants, this fleet has seen growth and decline in recent years. According to CFEC/ADF&G fish ticket data, three Unalaska/Dutch Harbor jig vessels fished groundfish in 1992, two fished in 1993, and then there was an upsurge in participation with between 13 and 18 vessels reporting per year from 1994 to 1997, inclusive. A decline quickly followed, however, as in 1998, 1999, and 2000, there were 9, 8, and 7 vessels participating each year, respectively. There are also some small boat longline groundfish activity by small boats, but the level of effort in federal waters by local residents within this small boat fleet is difficult to assess with currently available data.

In Akutan, like Unalaska, the fleet that delivers at the local processing facility is a non-residential fleet. Unlike Unalaska, however, the small boat fleet from the community is comprised nearly exclusively of open-skiff type of vessels that generally do not deliver groundfish to the plant, so the residential fleet from the village/traditional community is essentially not engaged in the commercial groundfish fishery. At present, there are few if any joint production opportunities.

In the case of Sand Point and King Cove, there is a residential fleet that delivers groundfish in significant volume to the plants, in addition to deliveries from non-residential catcher vessels. In 2000, 57 of the 80 total vessels in the Alaska Peninsula and Aleutian Islands region were owned by residents of King Cove and Sand Point (including six of the 10 'ghost' vessels[24]). Looking at the vessel classes involved, it is unlikely, for reasons outlined above, that the four local pot boats (all over 85 ft in length) are even in part subsistence vessels. It is also unlikely that the two "04-TCV Non-AFA" vessels over 90 ft in length (two in King Cove and one in Sand Point) commonly engage in subsistence (due to high operating costs and an inherent lack of flexibility when compared to smaller vessels), although the third vessel in this class, at 68 ft, is more likely to do so. The rest of the local vessels are of a size that they are likely to engage in subsistence, just as their size typically corresponds to a higher degree of diversity within commercial fisheries, as seen in the information presented in Section 3.9.2.

For Kodiak, similar to Sand Point and King Cove, there is a residential fleet that delivers significant amounts of groundfish to the local processing plants. The City of Kodiak-based vessels account for 95 percent of the groundfish total ex-vessel value of the region, and about 87 percent of all groundfish vessels in the region.

[23] This general point is also developed on the ADF&G website Subsistence FAQ at: http://www.state.ak.us/local/akpages/FISH.GAME/subsist/geninfo/about/subfaq.htm

[24] One factor to keep in mind is that 'ghost' vessels are so classified because while they made groundfish landings, they did not make enough to put them into a particular class, and therefore they are not likely to be affected by any of the alternatives.

Old Harbor and Ouzinkie vessels each account for between one and 2 percent of the total regional catcher vessel ex-vessel value. Old Harbor is home to about 6 percent of the groundfish vessels in the region, and Ouzinkie about 3 percent of these vessels. Port Lions and Larsen Bay each represent less than one percent of value and 2 percent of regional vessels. As a general rule, the larger vessels in the region tend to be disproportionately associated with the community of Kodiak compared to the smaller villages, so some joint production can be assumed to be taking place in these smaller communities as well as among the smaller vessels within the Kodiak fleet.

For Southcentral and Southeast communities with their diversified groundfish fleets, little is known about current joint production practices, but joint production may be assumed to be occurring. In general, however, while joint production may be relatively widespread, joint production concerns resulting from any of the groundfish management alternatives being contemplated are likely to be concentrated among small vessel owners in a relatively small number of communities. A summary of past/present effects of actions and events on subsistence is presented in Table 3.9-128.

3.9.6 Environmental Justice Existing Conditions

3.9.6.1 Regulatory Context

Concerns regarding environmental equity are generally termed environmental justice. Environmental justice can also be defined as "the determination of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, and /or socioeconomic status" (Bryant 2001). Environmental justice issues encompass a broad range of impacts including those on the natural and physical environment and related social cultural and economic effects. While not a part of NEPA itself, EO 12898 (Environmental Justice, 59 FR 7629 [1994]) requires each federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health and environmental effects on minority populations and low-income populations."

As under NEPA itself, "environmental" effects under EO 12898 are construed to encompass social and economic effects, and these are discussed in some detail in this section. Human health effects, as mentioned in EO 12898, would appear to be less relevant to impacts potentially associated with the various groundfish fishery management alternatives being considered in this Programmatic SEIS. EO 12898 does include language regarding the need to identify differential patterns of subsistence consumption of fish and wildlife (which is done in Section 3.9.5 and noted in summary form in this section), but it goes on to link this data collection with potential human health risks associated with the consumption of pollutant-bearing fish and wildlife. While subsistence in Alaska is associated more strongly with minority (Alaska Native) populations and low-income populations (those in rural areas with fewer commercial economic opportunities) than other populations, there is no indication that any of the alternatives being considered would result in a degradation of resources in a manner such that their consumption would result in a health risk elevated above existing conditions.[25]

[25] This is quite a different situation than found in a number of other parts of the United States, where there are health concerns that result from minority populations and low-income populations being more reliant on pollution-bearing subsistence resources than the general population as a whole. This, along with the observation that minority populations and low-income populations were bearing the brunt of locally undesirable land uses - including those that involved direct environmental health concerns - was one of the major equity concerns that sparked the environmental justice movement. Pollution associated with the

In order to determine whether environmental justice concerns exist, the demographics of the relevant area are examined to determine whether minority populations or low-income populations are present and could be disproportionately impacted by the proposed alternatives. The question as to whether a proposed alternative raises environmental justice issues depends to a large degree on the history or circumstances of a particular community or population, as well as the specific ties of that community or population to the resources (or access to resources) that will be changed by the alternative.

There is no standardized methodology for identification or analysis of environmental justice issues. The demographics of the affected area should be examined to determine whether minority or low income populations are present. If so, a determination must be made as to whether the implementation of the alternatives may cause disproportionately high and adverse human health or environmental effects on the minority populations, or low income populations present.

In determining what constitutes a low-income or minority 'population,' CEQ guidance, with specific regard to minority populations, states: "if the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis." While no available federal guidance addresses the determination of low-income populations, a similar approach has generally been adopted when preparing NEPA documents (King, 2001). The U.S. EPA has stated that addressing environmental justice concerns is entirely consistent with NEPA and that disproportionately high and adverse human health or environmental effects on minority or low-income populations should be analyzed with the same tools currently intrinsic to the NEPA process. NOAA environmental review procedures[26] state that, unlike NEPA, the trigger for analysis under Executive Order 12898 is not limited to actions that are major or significant, and hence Federal agencies are mandated to identify and address, as appropriate "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

3.9.6.2 Community Variations and Data Limitations

The population structure of the regions varies considerably. As discussed below and elaborated in the detailed groundfish regional and community profiles recently produced for NPFMC (NPFMC website 2002), within

commercial groundfish fishery is not understood to be of particular concern for subsistence in Alaska, with the possible exception of commercial fishery operations in general being associated with localized environmental degradation in and around commercial fishing harbors. One example of this is seen in the major port of Unalaska where local residents typically avoid use of at least some subsistence resources (such as intertidal invertebrates) in the immediate harbor area due to concerns over contamination from vessels and various shore based commercial/industrial activities (and even earlier military activities) dating back to at least the World War II era. This is clearly a complex and long-standing situation, and no studies on the incremental contribution of environmental contaminants associated specifically with the groundfish fishery (as opposed to all of the other activities that have historically taken place or are currently taking place in this busy harbor) are known to exist, but it is understood that contemporary environmental regulations make current operations much less environmentally problematic than earlier harbor related activities.

Alternatively, in the Alaska (and groundfish fishery) specific context, it could be argued that any of the management alternatives that have the effect of decreasing subsistence resource consumption could result in a degradation of overall health (or other well-being) of human populations engaged in subsistence activities. This argument would be based on the assumption that consumption of wild resources results in positive health benefits in comparison to benefits derived from commercially available foodstuffs (or that participation in subsistence activities has beneficial health effects due to its central sociocultural importance and an associated perception - or psychological reality - of well-being). Available data do not allow a definitive treatment of this issue and, as a result, potential impacts to subsistence are treated in social and economic terms in this section rather than as a human health issue.

[26] NOAA *Environmental Review Procedures for Implementing the National Environmental Policy Act* (Issued 06/03/99)

Alaska, and particularly in the Aleutian and Kodiak regions, there is a relationship between the percentage of Alaska Native population and commercial fisheries development. Specifically, communities that have developed as large commercial fishing communities have become less Native in composition over time compared to other communities in the region. There are many variables involved, but most communities noted the relationship is quite straightforward. The fishery has also had an impact on the male-female population balance for some of the Alaskan communities that are the focus of intensive groundfish processing. This is due to the fact that processing workers reside within these communities for varying durations, and that this workforce is predominately male. While this type of direct impact on population structure attributable to groundfish is seen in few communities, these tend to be the communities with the highest level of groundfish-related processing activities and the highest engagement in, and dependence upon, the fishery. The differences in the male/female and Native/non-Native population segments are, to a degree, indicative of the type of structural relationship of the directly fishery-related population with the rest of the community. Again, this varies considerably from place to place and is not apparent in the Southcentral and Southeast Alaska regions in the same way it is in the Alaska Peninsula/Aleutian Islands and Kodiak Island regions.

Interpretation of these data, in terms of engagement with the community, is less straightforward for some regions than for others. As detailed in the regional discussions, and in the community profiles available elsewhere (NPFMC website 2002), communities are engaged in, and dependent upon, the fishery in quite different ways through resident catcher vessel fleets, onshore processing facilities, and locally associated catcher-processor (and/or mothership) entities. While no consistent data are available, field observations would tend to indicate that ownership and crew demographics of the residential catcher vessel fleet for the relevant Alaska groundfish communities tend to mirror those of the long-term male residents of the community at large. This situation would also appear to hold true for the smaller vessel catcher processor sectors based in the various Alaska regions. For the larger vessel catcher-processor and mothership sectors, those are, to a large degree, associated with the Washington region (with the caveat that ownership patterns have been changing in recent years and the percentage of Alaska-based ownership in general and Alaska CDQ ownership in particular has increased, as discussed at length elsewhere in this document), and crews tend to be drawn from a wide area rather than a particular community. These factors are discussed in a separate section below. For the large processing plants that utilize groundfish, the demographics of the workforce and the relation to the 'host' communities tend to be more complex, have substantial environmental justice implications, and are discussed at length below.

In some Alaska groundfish communities, processing plants tend to be industrial enclaves somewhat separate from the rest of the community, while for others there is no apparent differentiation between the processing workforce and the rest of the regional or local labor pool. A further complication for attribution of socioeconomic impacts to a regional base is the fact that for many workers in many of the sectors, groundfish-related work is performed in a region or community that is separate from where they have a number of other socioeconomic ties. It is not uncommon for fishery-related workers to spend relatively little money in their work region and to send pay ‘home’ to another community or region. In this sense, regional employment is indicative of a volume of economic activity, if not a specific level of labor activity directly comparable to other industries. The importance of this flow varies from region to region and from sector to sector, but is most apparent within communities that are most heavily engaged in the processing aspect of the groundfish fishery. For the purposes of this environmental justice analysis, however, these populations will be characterized as being resident in their residential workplace communities, consistent with U.S. Census methodology. One of the current limitations of U.S. Census data, however, is that not all of the 2000 data relevant to this environmental justice analysis have been released. Ethnicity by housing type (e.g., ethnicity

by group quarters and non-group quarters), particularly useful for examining resident processing workforce numbers in Alaska coastal communities for this analysis, is not available, so data from the 1990 U.S. Census are presented, keeping with the established practice of using federal census data for environmental justice analysis. Unfortunately for this analysis, however, the groundfish fishery has changed a great deal since 1990 in many ways, including the size and distribution of the workforce. This being the case, the 1990 census data were supplemented with data gathered from industry sources that characterize their workforce demographics for 2000. These data suggest that the workforce has come to include a much larger minority population component than was the case a decade earlier and reflected in the 1990 census information.

Some caution must be given in the comparison of the two different 1990 and 2000 resident workforce related data types. In order to supplement the dated 1990 U.S. Census information that is being used to infer the structure of the locally present or resident fishery-associated workforce, industry was asked to provide 2000 workforce demographics for their individual groundfish processing operations.[27] These data were not collected using a methodology similar to that used for the U.S. Census data, and this should be taken into account in the interpretation of the information. These data are self-reported and, like other self-reported data, there may be a degree of inherent self-interest bias within the information. Whatever bias exists is considered likely to be relatively small and not sufficient to materially alter the overall assessment of whether or not the local seafood processing workforce represents a population segment that is "meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis" such as the specific community or region. Further, in each relevant Alaska region, these data are supplemented with age and sex data from the 1990 and 2000 U.S. Census that allow a cross-check on both the gross and relative changes in the "industrial" population segment in the communities.

The demographic composition of the greater Seattle area is markedly different than that seen in the Alaska groundfish communities, and the same type of demarcation between the industrial fishing operations and the resident population is not apparent. Seattle is, in absolute terms, the community most engaged in the groundfish fishery among many of the important indices of involvement, but it is also the least engaged in terms of the relative importance of the fishery to the overall population and economy of the community (as discussed in detail elsewhere [NPFMC website 2002]). Summary information relevant to environmental justice considerations for Seattle is presented at the end of this section.

The CDQ region presents yet another type of environmental justice context. Environmental justice issues are salient in this region due to the nature of the demographic and economic structure of the region, and the nature of the participation of this region and its communities in the fishery through various mechanisms of the CDQ program. The specific attributes of participation vary as the program has been implemented differently in various subregions by different CDQ groups, but in general this program has been designed to foster economic development in minority (Native Alaskan) and economically underdeveloped communities. As such, any

[27] There has been some question in the past as to whether or not environmental justice provisions applied to non-U.S. citizens, and this has relevance for the analysis, given that a substantial number of resident aliens work in the local seafood processing plants. If it is assumed that EO 12898 is premised on the application of the equal protection clause, then it should not matter whether the affected population consists entirely or primarily of citizens or resident aliens. Further, available guidance for the implementation of EO 12898 recommends the use of U.S. Census data, and the methodology of the Census, i.e., where all persons are counted, argues strongly for the inclusion of foreign nationals in the environmental justice analysis. As noted by the EPA, however, census data alone may not always prove sufficient for a thorough analysis, "in part because the level of aggregation may not offer a fine enough mesh to identify the existence of minority and/or low-income populations." In this specific Programmatic SEIS instance, industry provided data are used to identify such 'pockets' of minority populations within various groundfish communities that are relevant to the analysis of the proposed alternatives.

impacts to the CDQ program and its communities are, essentially by definition, potentially environmental justice impacts. The existing conditions in this region and the attributes of the program are discussed in detail in Section 3.9.4.

Another type of environmental justice context concerns subsistence issues. While not only Alaska Natives participate in subsistence activities, areas in which subsistence activities are practiced that may be impacted by groundfish management alternatives are predominately Alaska Native. Therefore, impacts to subsistence are also, in general, potentially environmental justice impacts. Existing conditions for relevant subsistence associated populations are discussed in detail in Section 3.9.5. A summary of past/present effects of actions and events on environmental jusitce is presented in Table 3.9-128.

3.9.6.3 Regional Summaries

Alaska Peninsula/Aleutian Islands Region

General Community Population Attributes

Alaska Peninsula/Aleutian Island region communities with the strongest direct engagement in, and dependence upon, the North Pacific groundfish fishery are Unalaska, Akutan, Sand Point, and King Cove.[28] These four communities, and their specific ties to the groundfish fishery, were summarized in Section 3.9.3. In this section, community level information relevant to environmental justice analysis is summarized.

Table 3.9-99 provides ethnicity information from the 2000 census for each of the four communities.[29] As shown, these communities vary widely in their population structure. For example, Unalaska is the largest community, but has the lowest Alaska Native population percentage, and King Cove and Sand Point have a much higher Alaska Native population component than either of the other two communities. (While Akutan has a relatively low Alaska Native population percentage, the Alaska Native population is highly concentrated in one area and generally insulated from commercial groundfish related activity and its associated non-Native population. Thus, the Alaska Native portion of the community at least in some ways bears the most resemblance to "village life" from an earlier era among the four communities.) Unalaska has a far higher white or non-minority population percentage than the other three communities. Asian residents represent the largest population segment in Akutan, and the second largest in Unalaska (behind whites) and in King Cove (behind Alaska Natives), and the third largest in Sand Point (behind Alaska Natives and whites). These communities have quite different histories with respect to the growth of the different population segments present in the community in 2000. Each is summarized briefly below. One important constant across all of these

[28] As noted in an earlier section, there are also ties between the fishery to Adak, Chignik, False Pass, and St. Paul. However, these ties are far less pervasive and do not have the historical depth of the ties seen in Unalaska, Akutan, Sand Point, and King Cove. Due to these differences in existing conditions, the communities of Adak, Chignik, False Pass, and St. Paul are not detailed in this section, but each may experience impacts resulting from management actions under the various alternatives, as discussed in Section 4, if not to the degree seen in Unalaska, Akutan, Sand Point, and King Cove.

[29] As a methodological note, community populations vary quite a bit throughout the year as seasonal workers are brought in to the smaller Alaska communities to provide an adequate workforce for peak seafood processing demand. U.S. Census data do not take yearly averages, but rather represent a one time count. During the 1990 census, for example, information for rural Alaska communities was collected during the months of January through April1990 according to the Institute for Social and Economic Research at the University of Alaska. Although these data cannot represent the complexity of groundfish community the population dynamics, they do represent the best available data set that is comparable across communities and regions.

communities is that each is a 'minority community' in the sense that minorities make up a majority of the population in each community.

Unalaska may be described as a plural or complex community in terms of the ethnic composition of its population. Although Unalaska was traditionally an Aleut community, the ethnic composition has changed with people moving into the community on both a short-term and long-term basis. Not surprisingly, in the latter half of the 20th century, population fluctuations have coincided with periods of resource exploitation and scarcity.[30] For example, the economic and demographic expansion associated with the King crab boom in the late 1970s and early 1980s brought many non-Aleuts to Unalaska, including Euro-North Americans, Filipinos, Vietnamese, Koreans, and Hispanics. The Euro-American population shows a distinct change over the years, comprising around 30 percent of the population in 1970, over 60 percent in 1980 and 1990, and then back to 44 percent in 2000. The growth of Asian/Pacific Islander population (over 30 percent by 2000) is closely associated with the increasingly residential nature of the seafood processing sector workforce. Apart from the War years, prior to the growth of the current commercial-fisheries-based economy, Unalaska was an Aleut community. Since this development, however, the change over the period of 1970 to 1990 is striking. In 1970, Aleut individuals made up slightly over 60 percent of the total community population (and Alaska Natives accounted for a total of 63 percent of the population). In 1980, Alaska Natives, including Aleuts, accounted for 15 percent of the population; by 1990, Aleuts comprised only 7 percent of the total community population (with Alaska Natives as a whole accounting for 8 percent of the population). Overall representation was similar in 2000. This population shift is largely attributable to fisheries and fisheries-related economic development and associated immigration.[31]

Akutan is a unique community in terms of its relationship to the Bering Sea groundfish fishery. It is the site of one of the largest shoreplants in the region, but it is also the site of a village that is geographically and socially distinct from the shoreplant. This 'duality' of structure has had marked consequences for the relationship of Akutan to fishery. One example of this may be found in Akutan's status as a CDQ community. Initially (in 1992), Akutan was (along with Unalaska) deemed not eligible for participation in the CDQ program based upon the fact that the community was home to "previously developed harvesting or processing capability sufficient to support substantial groundfish participation in the BSAI . . ." though they met all other qualifying criteria. The Akutan Traditional Council initiated action to show that the community of Akutan, per se, was separate and distinct from the seafood processing plant some distance away from the residential community site, that interactions between the community and the plant were of a limited nature, and that the plant was not incorporated in the fabric of the community such that little opportunity existed for Akutan residents to participate meaningfully in the Bering Sea pollock fishery (i.e., it was argued that the plant was essentially an industrial enclave or worksite separate and distinct from the traditional community of Akutan and that few, if any, Akutan residents worked at the plant). With the support of the APICDA and others, Akutan was successful in a subsequent attempt to become a CDQ community and obtained CDQ status in

[30] The most dramatic population shift of this century was brought about by World War II. The story of the War, and the implications for the Aleut population of Unalaska and the other Aleut communities of Unalaska Island, is too complex and profound for treatment in this limited community profile. It may be fairly stated that the events associated with World War II, including the Aleut evacuation and the consolidation of the outlying villages, forever changed the community and Aleut sociocultural structure.

[31] The fact that there is a "core" Aleut population of the community with a historical continuity to the past also has implications for contemporary fishery management issues. These include the activities of the Unalaska Native Fishermen's Association and active local involvement in the regional CDQ program (through participation as an ex officio member as well as being actively engaged in group sponsored training programs, among other activities). While neither of these undertakings exclude non-Aleuts, Aleut individuals are disproportionately actively involved (relative to their overall representation in the community population).

1996. This action highlights the fundamentally different nature of Akutan and Unalaska. Akutan, while deriving economic benefits from the presence of a large shoreplant near the community proper, has not articulated large-scale commercial fishing activity with the daily life of the community as has Unalaska, nor has it developed the type of support economy that is a central part of the socioeconomic structure of Unalaska. While US Census figures show Akutan had a population of 589 in 1990 and 713 in 2000, the Traditional Council considers the "local" resident population of the community to be around 80 persons, with the balance being considered "non-resident employees" of the seafood plant. This definition, obviously, differs from census, state, and electoral definitions of residency, but is reflective of the social reality of Akutan. The residents of the village of Akutan, proper, are almost all Aleut.

Sand Point and King Cove share a more or less common development history, but one quite different from either Unalaska or Akutan. Sand Point was founded in 1898 by a San Francisco fishing company as a trading post and cod fishing station. Aleuts from surrounding villages and Scandinavian fishermen were the first residents of the community. King Cove was founded in 1911 when Pacific American Fisheries built a salmon cannery. Early settlers were Scandinavian, European, and Aleut fishermen. Historically, both of these communities saw a large influx of non-resident fish tenders, seafood processing workers, fishers, and crew members each summer. For the last several decades, both communities were primarily involved in the commercial salmon fisheries of the area, but with the decline of the salmon fishery, plants in both communities have diversified into other species. In more recent years, the processing plants in both communities have become heavily involved in the groundfish fishery, although their structural relationships to the fishery have diverged since the passage of the AFA. As discussed elsewhere (NPFMC website 2002), processing facilities in both communities qualified as AFA entities; however, King Cove qualified for a locally based catcher vessel co-op while Sand Point did not.

Three tables present information on income, employment, and poverty for the relevant groundfish communities of the region based on U.S. Census data. Table 3.9-100 displays basic information on community housing, households, families, and median household and family income. As shown, the income range is large for the communities shown, with the median family income in Akutan being roughly half of that in Unalaska. This does not reflect the entire range for the region, however, as two communities in the region (Atka and Nikolski) have a lower median family income than Akutan.

Table 3.9-101 displays data on employment and poverty[32] information for the relevant communities for 1990 and Table 3.9-102 shows comparable information for 2000. These tables show large differences between 1990 and 2000, and a comparison of the two tables may be used to point out some potentially problematic aspects of the 2000 data. As shown in Table 3.9-101, in 1990 there was virtually no unemployment in these communities, no doubt due in large to the presence of fishery-related employment opportunities. Percentage of poverty varies between the communities, but these communities do not represent the range of regional variation. In 1990, Atka had the highest unemployment in the region at 25.7 percent, whereas Cold Bay, False Pass, Nelson Lagoon, and Nikolski had no employment as all members of the workforce (a subset of the total population) that were seeking employment were actually employed. This figure is somewhat misleading; in some communities a large portion of the adult population may not be working and not seeking employment.

[32]Poverty figures in this section are based on U.S. Census information which, in turn, is based on the federal government's official poverty definition. Families and persons are classified as below poverty if their total family income or unrelated individual income was less than the poverty threshold specified for the applicable family size, age of householder, and number of related children under age 18 present. The poverty thresholds are the same for all parts of the country and are not adjusted for regional, state, or local variations in the cost of living. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index.

In 1990, Nelson Lagoon was the extreme example of this with 81 percent of the adults not working. In 1990, percent of poverty in the region ranged from 0 percent in Cold Bay to 42 percent in St. George. Data do not vary consistently with the presence or absence of commercial fishery development as might be expected. For example, Atka shows a very high rate of unemployment and percent of adults not working, yet there is a smaller percentage of persons in poverty than in Akutan, a community with an unemployment rate of less that one percent. This is attributable, in part, to the fundamentally different natures of the communities, with Atka being a small village and Akutan being a community with a large processing facility adjacent to the traditional village site. False Pass, Nelson Lagoon, Nikolski, and St. George, none of which had fish processing facilities at the time of the census, all had over 50 percent of the adults in the community not working. The contrast between these and the other communities is reflective of both lack of economic development in these communities and the nature of the workforce population in communities with shoreplants, where large numbers of processing workers are present, tend not to have non-working adult family members present with them, and tend to be in the community exclusively for employment purposes.

Table 3.9-102 shows a very different picture in 2000 than was seen in 1990, and a working knowledge of the fishing industry would seem to indicate the 2000 data are anomalous. For example, in 2000 the U.S. Census lists a total of 505 unemployed persons in Akutan. Given that the traditional village of Akutan consists of less than 100 persons (including all age groups, not just adults in the labor pool who could qualify as employed or unemployed), the overwhelming majority of persons enumerated as unemployed must have been idled seafood processing workers. While this unemployment may have been "real" in the sense that processing workers were present and not actively working when the census was taken, it is most likely an artifact of the timing of the census. Processing workers are not typically present in the community when the plant is idle for any extended period of time. Under normal conditions, there are no unemployed seafood processing workers present in the community (by design). These workers are transported to and from the community by their employer to meet labor demand at the plant. As part of the employment agreement, seafood processors typically provide room and board for workers, so it is uneconomic to have idled workers at the site unless the plant downtime is relatively brief (i.e., the cost of housing and feeding the employees during the idle interval does not exceed transportation, recruiting, training and other costs associated with sending workers out and bringing them back in, including some level of turnover that always occurs in these situations). The same type of data problem may be occurring in Sand Point and Unalaska, but this is not as clear as is the case for Akutan.

It is also important to note that some Alaska Native communities in the region that do not directly participate in the commercial groundfish fishery derive direct benefits from the fishery outside of the CDQ program. Primary examples of this are the smaller communities of the Aleutians East Borough. In this case, CDQ communities receive direct and indirect benefits of non-CDQ community (King Cove and Sand Point) participation in the fishery. Both King Cove and Sand Point are part of the Aleutians East Borough, and revenue that derives from landings in these communities (along with landings in Akutan), significantly benefit smaller Alaska Native communities in the Aleutians East Borough, such as False Pass and Nelson Lagoon. In this way, adverse impacts to the fishery that are seen in King Cove and Sand Point are also seen in False Pass and Nelson Lagoon, and may impact everything from school funding to basic service provision.

Population Attributes of the Resident Groundfish Fishery Workforce

Beyond the overall population, income, and employment figures for the individual communities, it is important for the purposes of environmental justice analysis to examine information on the residential groundfish fishery workforces. It is likely that employment and income losses or gains associated with at least

some of the alternatives would be felt among the local seafood processing workers, and these workers do not comprise a representative cross-section of the community demography. One method to examine the relative demographic composition of the local processing workforces is to utilize group quarter housing data from the U.S. Census (keeping with the established practice of using U.S. Census data for environmental justice analysis). The group ethnicity-by-housing type data are drawn from both the 1990 census and the 2000 census (and a subsequent section augments this information with industry-provided figures for 2000, see below). This is supplemented by age and sex data from the 1990 and 2000 U.S. Census to provide a cross check of census (and industry-provided) data and the population structure over this period. (This approach is applied to other regions subsequently discussed as well.)

Tables 3.9-103 and 3.9-104 provide information on group housing and ethnicity for Unalaska for 1990 and 2000, respectively. Group housing in the community is largely associated with the processing workforce. As shown in Table 3.9-103, 52 percent of the population lived in group housing in 1990. Also as shown in that same table, the total minority population proportion was substantially higher in group quarters (49 percent) than in non-group quarters (31 percent). The 2000 figures (Table 3.9-104) show a similar overall split between group quarters (51 percent of community population total) and non-group quarters populations (49 percent of the total), but the minority population distribution between and within housing types changed substantially in the 1990 to 2000 period. For example, "white" residents of Unalaska comprised 54 percent of the group quarters population in 1990, but only 30 percent in 2000 (and declined, to a lesser but still substantial degree, from 71 percent to 59 percent of the population within non-group quarters housing). Although demographic categories changed somewhat between the 1990 and 2000 census, some relatively large changes are readily apparent. For example, in 1990, the "Asian or Pacific Islander" category accounted for 27 percent of group quarters population, but 42 percent by 2000. In general, in 2000 Unalaska had a substantially greater minority population in absolute and relative terms than it did in 1990, and this is readily apparent within the group quarters population that is largely associated with seafood processing workers. In other words, environmental justice is potentially a large concern if there is the potential for processing worker displacement, and one that has grown through time.

With the population growth seen in association with the development of the commercial fishing industry, Unalaska's population has had significantly more men than women. Historically, this has been attributed to the importance of the fishing industry in bringing in transient laborers, most of whom were young males. Table 3.9-105 portrays the changes in proportion of males and females in the population for the years 1970, 1980, 1990, and 2000. Census data from the period 1970-1990 showed a climb in median age from 26.3 years to 30.3 years and then a further jump to 36.5 years in 2000. This is commonly attributed to an increase in relative size of the workforce (both fishery and non-direct fishery-related) in comparison to resident families. (Although some who come to Unalaska for employment opportunities bring children into the community, it is apparent that many do not, which drives up the median age.)

Table 3.9-106 provides information on group housing and ethnicity for Akutan for 1990, and similar information for 2000 is presented in Table 3.9-107. Group housing in the community is almost exclusively associated with the processing workforce. As shown, 85 percent of the population lived in group housing in 1990, which represents the extreme of the four communities considered in this region. In 2000, this figure was over 89 percent. Also as shown, the ethnic composition of the group and non-group housing segments were markedly different, with the non-group housing population being predominately Alaska Native (83 percent and 87 percent in 1990 and 2000, respectively), and the group housing population having little Alaska Native/Native American representation (1 percent in 1990, 7 percent in 2000). Like Unalaska, overall

minority population representation was higher in absolute and relative terms in the community as a whole and in both group and non-group quarters in 2000 than in 1990.

Table 3.9-108 shows the population composition of Akutan by sex in 1990 and 2000. These data are clearly indicative of a male-dominated industrial site rather than a typical residential community.

Table 3.9-109 provides information on group housing and ethnicity for King Cove in 1990, and similar information for 2000 is presented in Table 3.9-110. As with the other communities, group housing in the community is largely associated with the processing workforce. As shown, 42 percent of the population lived in group housing in 1990 and 38 percent in 2000. The distribution of ethnicity between housing types is striking. In 1990, the Alaska Natives/Native Americans comprised 67 percent of the non-group quarters population in the community, and the analogous figure for 2000 was 75 percent. For both 1990 and 2000, there was only one Alaska Native/Native American individual living in group quarters in the community (about one-half of one percent of the total group quarters population). Shifts in ethnic populations are also apparent between 1990 and 2000, with the "Asian" group comprising over 64 percent of the group quarters population in 2000, up substantially from 1990. The "White" component of the population was smaller in absolute and relative terms in 2000 than in 1990 for the community as a whole and in group quarters. Among non-group quarters residents, the number of "White" residents was larger in 2000 than in 1990, but still represented a smaller proportion of the non-group quarters population in 2000 than in 1990. In other words, environmental justice is clearly an issue of potential concern for the community as a whole and for the seafood processing associated group quarters population in particular, and census counts suggest that minority representation has substantially increased over the period 1990 to 2000.

Table 3.9-111 presents information on the male to female ratio for King Cove for 1990 and 2000. The disproportional representation of males within the overall population is indicative of the transient nature of much of the workforce.

Table 3.9-112 provides information on group housing and ethnicity for Sand Point for 1990, and similar information for 2000 is provided in Table 3.9-113. As shown, 21 percent of the population lived in group housing in 1990, which was the lowest figure for the four communities detailed within this region. In 2000 this figure was 36 percent, which was greater than the King Cove figure for that same year. In 2000, no Alaska Natives/Native Americans lived in group quarters in the community, but comprised 66 percent of the population living outside of group quarters. As shown, the ethnic diversity among group quarter residents is, in general, substantially less in 2000 than in 1990, but detailed comparison of individual groups (other than White, Alaska Native/Native American, and Asian) is problematic due to missing data (the "unknown" category). Asians comprised over 60 percent of all persons living in group quarters in 2000 with persons of Hispanic origin accounting for about two-thirds of the remaining 40 percent of group quarter residents.

Table 3.9-114 presents information on age and sex of Sand Point's population for 1990 and 2000. As shown, the significant male-to-female imbalance seen in other large regional groundfish communities is present in Sand Point as well.

Industry Provided Data

Information on 2000 workforce demographics was obtained for four of the six major groundfish shoreplants in the Alaska Peninsula/Aleutian Islands region, as well as one of the two floating processors that are

classified as inshore plants. At least some of the entities voluntarily providing these data consider them confidential or proprietary business information, but agreed to provide the information if it was aggregated with data supplied by others such that details about individual operations were not disclosed. As a result of these concerns, communities cannot be discussed individually. It can be stated that the total combined reported processing (and administrative) workforce of 2,364 persons was classified as 22.5 percent white or non-minority, and 77.5 percent minority. Reporting shoreplants ranged from having a three-quarters minority workforce to an over 90 percent minority workforce. It is worth noting that different firms provided different levels of detail in the breakout of the internal composition of the minority component of their workforce. For some plants, the total minority figure was not disaggregated, and too few plants within this region provided detailed data to allow region-specific discussion. In general, however, all of the shoreplants in this region that provided detailed data have workforces that are 5 percent or less Black or African American and 5 percent or less Alaska Native/Native American (a pattern also seen in the detailed data from Kodiak plants). More variability was seen among other minority population components. The group classified as Asian/Pacific Islander was the largest minority group in two-thirds of the plants in any region reporting detailed data, and the group classified as Hispanic was the largest minority group in the remaining one-third. Two entities provided time series data. One provided data spanning a 10-year period, while the other provided information covering a four-year span. For the former, the minority workforce component increased over time; for the latter no unidirectional trend existed.

Regional Summary

The communities in the region that are most engaged in, and dependent upon, the groundfish fishery are those with populations comprised of more minority residents than non-minority residents. The structure of the minority population component varies from community to community, as does the proportion of the community population that is comprised of Alaska Native residents. Further, the workforce at the processing plants that would likely feel the impacts of the alternatives is overwhelmingly comprised of minority workers. While no systematic quantitative data are known, field observations would suggest that for a very substantial portion of the workforce, English is a second language (this is reinforced by data from local schools such as Unalaska, where 47 percent of the entering kindergarten students in 2000-2001 were English as a second language students) and languages other than English are commonly utilized in the workplace among processing crews. These factors, along with limited opportunity to acquire job skills in other economic sectors, would tend to indicate that these populations would be less able to easily acquire alternative employment outside of the seafood industry if there were widespread job reductions as a result of the alternatives. However, information on the level of job turnover/rates of rehire (discussed elsewhere [NPFMC website, 2002]) suggests that there is a fair degree of mobility among at least part of this workforce.

Kodiak Island Region

General Community Population Attributes

Within the Kodiak region, the City of Kodiak is the location of virtually all of the direct links with the groundfish fishery. Given these circumstances, it will be the only regional community discussed in detail.[33]

[33] Processing data does show that groundfish are also run at Alitak, but this is a relatively specialized operation and very small relative to the aggregated operations associated with the City of Kodiak.

Kodiak is a complex community in terms of the ethnic composition of its population. Sugpiaqs (Koniags) were the original inhabitants of Kodiak Island. Beyond earlier development, fishing and military buildup associated with World War II brought many non-Natives to Kodiak, primarily Caucasians but also a substantial number of non-Native minorities, at least initially associated primarily with fish processing employment. Detailed information on community growth and the relative growth of different population segments is available elsewhere (NPFMC website 2002). The Alaskan Native population has remained at approximately the same percentage since the 1970s, but the white (non-minority) population has declined in terms of percentage over time. Overall, there has thus been a gradual, long-term shift in ethnic composition, with Asian and Pacific Islanders increasing in percentage. Census data from 2000 detailing ethnicity are presented in Table 3.9-115. As shown, the majority of Kodiak's population is comprised of minority residents.

The following two tables present information on income, employment, and poverty for the City of Kodiak and the Kodiak Island Borough and are based on 2000 U.S. Census data. Table 3.9-116 displays basic information on community housing, households, families, and median household and family income. As shown, the City of Kodiak is above the borough income averages. For example, median family income in Kodiak itself is about 3 percent higher than the borough as a whole. Compared to all communities in the region, the City of Kodiak places at the upper end of the range. In 2000 the highest median family income in the region was in the community of Chiniak, with a figure of $75,067, while the lowest figure was $19,167 for Karluk.

Table 3.9-117 displays data on employment and poverty for the City of Kodiak and the Kodiak Island Borough for 2000. As shown, there was very little unemployment in these jurisdictions, presumably due in part to the presence of fishery-related employment opportunities, and also due to the fact that the Kodiak economy is relatively diversified by rural Alaska standards (and particularly in comparison to the Aleutian region communities). The City of Kodiak had the second lowest unemployment of any civilian community in the region (3.6 percent compared to 2.1 percent in Port Lions), whereas the village of Old Harbor had the highest unemployment in the region at 12.5 percent. Proportions of the population considered to be below the poverty threshold varied between the communities, but as was the case in the Aleutian region, this is somewhat misleading. For example, Ouzinkie had the lowest poverty rate (6 percent) of any community in the region in 2000, but at the same time 48 percent of the adults in the community were not working. Old Harbor has the highest poverty rate in the region at 29.5 percent.

Population Attributes of the Resident Groundfish Fishery Workforce

Table 3.9-118 provides information on group housing and ethnicity for Kodiak for 1990, and similar information for 2000 is presented in Table 3.9-119. Group housing in the community is largely associated with the processing workforce, but not to the nearly exclusive degree seen in the Aleutian communities. The institutional base and range of housing types in Kodiak is more complex. As shown, only 6 percent of the population lived in group housing in 1990, and only about 2 percent in 2000. This is a much lower percentage of population residing in group quarters than in the other communities profiled, and is consistent with a processing workforce more heavily drawn from the local labor pool. In 1990, while there was a significant difference between the group quarter and non-group quarter demographics (with the group quarter population being a higher minority group than the community population as a whole), the differences are not as sharp in general or for particular groups as seen in the Aleutian region communities. A similar pattern is seen in the 2000 data; however, the small numbers of persons involved make conclusions about the proportionality or trends of change between groups somewhat tenuous.

The male to female imbalance is present in the community, as shown in Table 3.9-120, but it is of a lesser magnitude than seen in the Aleutian region groundfish communities. This is consistent with Kodiak's fishery-related workforce being drawn more from the local community labor pool than is the case in the Aleutian communities.

Industry Provided Data

Given the nature of the relationship between the processing workforce and the local communities, industry information comparable to that of the Aleutians region was not systematically collected from Kodiak region entities. The information received was not sufficient to be able to disclose precise community level information due to confidentiality concerns. As a generality, the 2000 data received indicated that at least some shoreplants in this region have workforces with a greater minority population component than the Aleutian regional average (77.5 percent). This is despite the fact that, as a rule of thumb, the Kodiak processing workforce is drawn to a larger degree from a local labor pool than is the case for the Aleutian communities. As was the case for the Aleutian region, different firms provided different levels of detail in the breakout of the internal composition of the minority component of their workforce. For some plants the total minority figure was not disaggregated, and not enough plants within this region provided detailed data to allow region-specific discussion. However, as mentioned in the Aleutian region discussion, all of the shoreplants in any region that provided detailed data have workforces 5 percent or less Black or African American and 5 percent or less Alaska Native/Native American. For the Kodiak region, the group classified as Asian/Pacific Islander was the largest minority group noted within the limited detailed data received.

Regional Summary

The community in the region that is most engaged in and dependent upon the groundfish fishery (Kodiak) is comprised of more minority residents than non-minority residents. While systematic data do not exist, the data that are available suggest that the workforce at the processing plants that would likely feel the impacts of the alternatives are primarily comprised of minority workers.

Southcentral and Southeast Alaska Regions

Environmental justice is likely to be much less of an issue in the Southcentral and Southeast Alaska region communities than in the Alaska Peninsula/Aleutian Islands and Kodiak Island regions, for several reasons. Of primary importance among these is the nature of the communities most directly engaged in the commercial groundfish fishery. As described in Section 3.9.3, the communities most engaged in the groundfish fishery in Southcentral Alaska, particularly with respect to the processing sector, are largely non-Native communities, and have relatively large populations and diversified economic opportunities, especially compared to the Alaska Peninsula/Aleutian Islands groundfish communities. The same holds true for the Southeast Alaska region, with the exception of Yakutat. A second factor is the relatively low level of processing employment directly attributable to groundfish in these regions that could potentially be at risk under at least some of the groundfish management alternatives. For example, in 2001, there were only an estimated 106 FTE groundfish processing jobs among all of the communities in the entire Southeast Alaska region (or about 33 times fewer groundfish processing FTEs than in the Alaska Peninsula/Aleutian Islands region). While the potential loss of these positions would, of course, be of consequence for the individuals and operations involved, the diversity of processing operations, size and diversity of community populations, and the availability of alternative economic opportunities would serve to dampen the environmental justice dimension of any impacts

realized at the community or regional level. Similarly, in 2001 among all of the communities in the Southcentral Alaska region, there were an estimated 150 groundfish processing FTEs, or about one-quarter the number found in Kodiak alone. These community and workforce factors, especially in combination, mean that, in general, the type of environmental justice concerns seen in the Alaska Peninsula/Aleutian Islands and Kodiak Island regions are largely absent. Further, environmental justice concerns linked to Steller sea lion and salmon subsistence activities are also largely absent in these two regions. As a result, detailed environmental justice existing conditions information has not been developed for these regions. The regional data presented in Section 3.9.3 are considered sufficient for analytical needs.

Washington Inland Waters Region

General Community Population Attributes

The greater Seattle area is the center for much of the economic activity related to the North Pacific groundfish fishery, but the geographic footprint of those activities is difficult to define. The boundaries cannot be attributed to specific communities or neighborhoods in the same manner as Alaska communities may be linked to the fishery, as discussed in detail elsewhere (NPFMC website 2002). For comparative purposes, and so that the information on the Seattle-based catcher-processor sector described below can be compared to the greater Seattle population base, Table 3.9-121 provides ethnicity data for the Seattle-Tacoma Consolidated Metropolitan Statistical Area (CMSA) as defined by the U.S. Bureau of the Census.[34] As shown, unlike the Alaska groundfish communities, the white portion of the population comprises a large majority of the overall population (i.e., racial or ethnic groups classified as minorities are mathematical minorities within the local overall population, unlike the relevant Alaska communities).

Information on household income and employment and poverty information for the Seattle-Tacoma CMSA comparable to that provided for the relevant Alaska groundfish communities is not presented here. These types of data at the CMSA level are not meaningful for this environmental justice analysis due to their high level of aggregation.

Population Attributes of the Resident Groundfish Fishery Workforce

Given the nature of engagement with the fishery, the Washington Inland Waters Region does not have the same type of resident workforce focused in individual communities in a manner comparable to that seen in Alaska communities, as discussed above. Rather, this environmental justice analysis will focus on industry provided sector data as described below.

Industry Provided Data

As noted in the introductory discussion, catcher vessel ownership and crews are assumed to reflect the overall demographic make up of the male working age population in their home communities. Although systematic demographic data were not collected for the groundfish catcher vessel crews in the Washington inland waters

[34] A Consolidated Metropolitan Statistical Area (CMSA) consists of two or more contiguous MSAs The Seattle-Tacoma WA CMSA consists of Seattle, WA PMSA (1) King and Snohomish Counties, and (2) Tacoma (Pierce County). A Metropolitan Statistical Area can be defined as a city of over 50,000 inhabitants together with the county in which it is located and contiguous counties which are economically and socially integrated with the central city. It may also consist of an urbanized area of 50,000 with a total metropolitan area population of at least 100,000.

region, interviews with local sector association personnel suggest that minority population representation within this sector does not exceed the proportion of minority representation in the general population; therefore, environmental justice is not an issue with respect to potential impacts to this sector.

Shore processing plants are not present in this region, and the mothership sector data cannot be presented due to confidentiality restrictions based on the small number of entities. As a working assumption, it is assumed that the mothership employment structure is similar to that of the catcher processor sector, although the catcher-processor sector may have a somewhat higher minority representation in the workforce due to more consistent targeted hiring in rural Alaska.

Information on catcher-processor workforce demographics for 2000 was obtained from seven entities that together account for almost all (99 percent) of the non-CDQ target pollock caught by trawl catcher processors in the BSAI as well as 86 percent of the CDQ pollock. (While these entities also catch a significant amount of Pacific cod, catch among catcher-processors in the Pacific cod fishery is more dispersed over a larger group of participating entities.) Different firms provided different levels of detail in the breakout of the internal composition of the minority component of their workforce, but the detailed information provided encompassed 1,906 out of the 2,126 persons reported, or 90 percent of the total reported workforce. Table 3.9-122 provides ethnicity information for those entities reporting detailed breakouts. As shown, the portion of the workforce within the detailed reporting set was 36.9 percent white or non-minority and 63.1 percent minority. Adding the more highly aggregated data does not significantly change the overall minority/non-minority ratio. Within the total set of responding entities, individual entity workforces ranged from a 36 percent minority workforce to an 85 percent minority workforce. Among entities reporting detailed data, Hispanic was the largest minority component in every entity's minority workforce segment, with one exception (in which case the largest minority segment was Asian/Pacific Islander, and Hispanic was second). Apart from the entity where Asian/Pacific Islander workers were the largest minority worker segment, Asian/Pacific Islanders were the second largest minority group represented for all but one of reporting entities (in which case the second largest group was Alaska Native/Native American).

Regional Summary

For reasons discussed earlier, environmental justice is not a regional or community level issue for North Pacific groundfish management initiatives for the Washington inland waters region or the greater Seattle area. Although quantitative data are not available to confirm this, based on interview data it does not appear to be an issue for the regionally based catcher vessel fleet either. As there are no Alaska groundfish shore-based processing entities in this region, the types of environmental justice issues associated with these workforces seen in some of the Alaska regions are not present in this region. Industry-provided data for the catcher-processor sector, however, show that environmental justice is a potential issue among that sector's workforce. While the population of the greater Seattle area was 23 percent minority in 2000, this workforce was 63 percent minority for that same year. If substantial job losses in this sector were to occur under various management alternatives, they would disproportionately accrue to minority populations. As noted elsewhere (NPFMC website 2002), while most of the hiring for catcher-processor entities is done out of the greater Seattle area, there are targeted hiring efforts directed at Alaska residents in general and Alaska Native residents in particular. In addition to CDQ-related employment issues associated with this sector and discussed separately, loss of other Alaska Native held jobs in the catcher-processor sector is also a potential environmental justice issue, but not for the Washington inland waters region.

Oregon Coast Region

There is no indication from available information that environmental justice will be an issue in the Oregon Coast region. No BSAI groundfish processing plants operate in this region, nor are any owned by residents of this region, so populations associated with this sector are not a concern. As detailed elsewhere (Section 3.9.3), this region is engaged in the Alaska groundfish fishery primarily through the catcher vessel sector. While demographic data on catcher vessel owners and crews are not available, discussions with industry sources and familiarity with the fishery would seem to indicate that this group is not disproportionately comprised of individuals from minority populations.

3.9.6.4 Other/Alaska Native Specific Environmental Justice Issues: Community Development Quota Regions, Subsistence, and Community Outreach

Two main socioeconomic issue areas discussed elsewhere in this document are central to environmental justice considerations. For reasons noted below, impacts to the CDQ program and its associated communities as well as impacts to subsistence (and the relevant associated communities) are likely to raise environmental justice concerns. In addition to these two issue areas that potentially involve specific impacts to minority populations and low-income populations, addressing environmental justice concerns also involves a proactive dissemination of information to minority populations and low-income populations that may otherwise be under-represented in the public involvement process. To address this type of concern, a concerted effort was made to contact a large number of Alaska Native entities, as summarized below.

The CDQ region of western Alaska is a specific area of concern for environmental justice issues with respect to the potential fishery management alternatives covered by this Programmatic SEIS. The CDQ program was explicitly designed to foster fishery participation among, and to direct fishery benefits toward, minority populations (87 percent of total population in these villages is comprised of Alaska Native residents) and low-income populations in the economically underdeveloped communities in western Alaska. To the extent that the CDQ program has achieved these objectives, negative impacts to the CDQ program and communities are essentially, by definition, environmental justice impacts. CDQ region existing conditions are discussed in Section 3.9.4 and in greater detail elsewhere (NPFMC website 2002).

Subsistence impacts are also potential environmental justice issues, given the disproportionate involvement of Alaska Natives in subsistence activities. Relevant existing conditions information for subsistence is summarized in Section 3.9.5. As noted in that section, there is the potential for subsistence activities to experience impacts associated with various management alternatives in the areas of groundfish subsistence (through direct competition for the resource), subsistence use of Steller sea lions (through indirect impacts to Steller sea lion populations), joint production subsistence opportunities (through curtailment of the ability to effectively utilize commercial vessels or gear for subsistence purposes), and some subsistence salmon fisheries (through at-sea bycatch interception of chinook and chum salmon).

The geographic area of potential impact to subsistence (and therefore the communities potentially involved) varies by type of subsistence activity. Joint production impacts are, by definition, limited to areas that are directly engaged in the commercial fishery. On the other hand, vast tracts of the Interior of Alaska with dozens of villages are engaged in the relevant subsistence salmon fisheries. In addition to impacts to subsistence potentially qualifying as an environmental justice issues as a result of disproportional Alaska

Native (minority population) involvement, impacts to subsistence are also likely to be environmental justice impacts. For a number of the relevant communities, subsistence is an important aspect of community economic life where commercial economic opportunities are limited and incomes are relatively low (i.e., low-income populations are involved in subsistence in some areas). Not only would an impact to subsistence potentially be a disproportionate impact to a low-income population, the impact would make a low-income population even worse off in economic terms than under existing conditions. Information on existing conditions in the areas and communities involved in the relevant subsistence activities may be found in Section 3.9.5.

The EO on environmental justice (EO 12898) specifies that it shall apply equally to Native American programs and calls for consultation with Federally-recognized Indian Tribes. In terms of specific outreach to include Alaska Native entities and populations in this Programmatic SEIS process, contacts appropriate for government-to-government consultations (pursuant specifically to EO 13175) were made, and Alaska Native groups were contacted individually over and above the regular scoping process notifications. This was to ensure the opportunity for these entities to provide input and receive information consistent with the notification and disclosure intent of environmental justice concerns. Specific notification of Alaska Native communities and entities was conducted utilizing a contact list developed during the original North Pacific groundfish Programmatic SEIS effort. During that effort, NOAA Fisheries obtained from the Bureau of Indian Affairs a list of all entities that are formally recognized by the federal government as tribal governments in Alaska. A subset of this state-wide list was created by employing (and extending) the CDQ eligibility criteria, including use of a 50-nautical-mile buffer from the coast. Additional entities were added to the list by using this methodology not only in the BSAIs area (like the CDQ program itself), but also by applying it to the entire Alaskan GOA coast as well. All of the approximately 250 entities on the Bureau of Indian Affairs list that fell within this 50-nautical-mile wide coastal swath were placed on the contact list. These entities were contacted regarding the Programmatic SEIS process and public involvement opportunities, and encouraged to begin correspondence with NOAA Fisheries. This targeted process encompasses an area and set of Alaska Native entities and communities in the coastal region larger than those directly involved in the fishery, the CDQ region, or the subsistence activities of concern noted above (with the possible exception of some Interior subsistence salmon communities).

3.9.7 Market Channels and Benefits to U.S. Consumers

3.9.7.1 Groundfish Products and Market Channels

This section first provides a summary of the primary products derived from the Alaska groundfish fisheries and a brief overview of secondary processing and product distribution activities. Next, the difficulties of tracking the movement of groundfish products to their final point of sale are examined. Lastly, available data are used to summarize the product flows and markets for pollock, Pacific cod, sole, and rockfish.

Primary Products

Groundfish harvested in the Alaska fisheries are processed at a variety of inshore facilities and on motherships and catcher processors (Section 3.9.2). The groundfish are made into a wide range of primary products. In this

analysis, primary product is defined as the product form after the initial stage of processing.[35] By this definition, all products produced directly from raw fish are considered primary products. These products may be table-ready or final product, but more often they are reprocessed before they are sent to retail markets or foodservice establishments. Secondary processing is defined as any processing that occurs after the primary products have been transferred to a different facility. Secondary processing includes the production of kamaboko from surimi and the production of breaded fish sticks from fillets.

Table 3.9-123 shows the various primary products by weight made from Alaska groundfish during the 1992-2001 period. Table 3.9-124 shows the various primary products by wholesale value for the same period. Atka mackerel (a member of the A-R-S-O species group) is primarily produced as a headed and gutted or whole product. Most flatfish by volume are also headed and gutted, often with the roe left intact. A large percentage of flatfish are frozen whole, while a small percentage, primarily yellowfin sole, are made into kirimi, a steak-like product. Almost all sablefish are produced into head-and-gut product. Most of the product made from Pacific cod is headed and gutted, but a significant proportion is also made into fillets. Comparing products by weight can be misleading. Fillets are typically skinless and boneless product. A 5-pound Pacific cod might yield 1.25 pounds of fillets. The price per pound for fillets is higher than for head-and-gut product, primarily because fillets require less secondary processing. Surimi constitutes the largest portion of pollock product, with fillets accounting for the next largest percentage. Pollock roe, which accounts for only 4 percent of total product by weight, is extremely important to processors because of its high price in Japan. Substantial amounts of meal and oil are also produced from pollock, although these are generally ancillary products made from bones, skin, and trimmings.

Overview of Secondary Processing Activities

During the period covered in this analysis (1992-2001), there were no major secondary processors operating in Alaska. Almost all product was shipped out of Alaska in primary form. Recently, Alaska Seafood International Company began operations in a seafood processing facility constructed in Anchorage in 2000 and is preparing table-ready products from a variety of Alaska fish, including some groundfish. The Alaska Industrial Development and Export Authority, a state agency, has invested $50 million in the processing plant and owns the title to the company's buildings and land. To date, the enterprise has sent shipments of processed salmon, halibut and Pacific cod to markets in England and the Lower 48.

Groundfish harvested in Alaska is most often exported as primary product, although some leaves in a raw form, such as whole frozen fish. While most of the groundfish products are exported to Asia and Europe, some are shipped to the Lower 48. How much remain in the U.S. and how much are shipped abroad varies from year to year. Products shipped to the Lower 48 may either be reprocessed (primarily in the Washington Inland Waters Region) or re-sorted and exported as a primary product. Companies such as Icicle and Trident have primary production capacity in Alaska and secondary processing plants in the Puget Sound area. In these cases it would be possible to track how much Alaska product is used in secondary processing facilities and the related number of workers. However, numerous other food manufacturers take primary groundfish product from Alaska to make a variety of table-ready foods and other products. For example, Gorton's has secondary processing facilities that reprocess groundfish products from Alaska and other areas. Data on the number of

[35] This definition of primary processing differs from definitions used by processors when they report production to NOAA Fisheries in Weekly Processor Reports. In weekly reports processors differentiate primary products, such as fillets or surimi, from ancillary products, such as roe and fish meal.

workers in all such facilities and the percentage of primary product at these facilities that originates in Alaska are not available.

Transportation Facilities

Groundfish are transported from Alaska to domestic ports (primarily in the Washington Inland Waters Region) by a number of different carriers, depending on where the fish is processed. For example, the primary carriers operating in western Alaska include CSX Lines, Coastal Transport, Samson Tug and Barge, and Northland Services. The primary carriers in central Alaska include Totem Ocean Trailer Express as well as those operating in western Alaska.

Groundfish transported from Alaska to foreign ports typically are carried by foreign tramper vessels. Product carried from the Pacific Northwest to foreign ports can be carried by foreign trampers or steamships. In the past, some product transported from the U.S. to foreign ports was carried by American-owned and American-flagged companies, such as American President Lines and Sea Land. However, Sea Land is no longer American-owned or flagged and American President Lines is not American-owned. Such changes in ownership and flagging limit the role domestic companies play in the movement of Alaska groundfish and, therefore, limit the scope of potential impacts on U.S. shipping lines from any changes in the groundfish fisheries.

Data Limitations

Sufficient data are not readily available to analyze the volume or value of groundfish shipments from Alaska (in primary or any other form) to the Lower 48 or to foreign markets. Purchasing detailed shipping data from commercial vendors such as the Port Import Export Report Service was beyond the scope of the project. Other data limitations include aggregation levels too broad for a meaningful analysis, confidentiality constraints and different species and product groupings across data sources. For example, the U.S. Seafood Trade Report tracks annual seafood production and export volumes by fish species. How much cod was actually produced in Alaska can not be determined from a category such as "frozen cod fillets." Commercial Fisheries Entry Commission data provide insights into how much primary product, by species or product type, comes from Alaska. Unfortunately, it is not always possible to combine data from different databases because the categories often differ from one database to the next. NOAA technical memorandums are also available that focus on the production of fish products and exports of edible fishery products. These reports show the volume and value of groundfish products exported each year from the Pacific Northwest. For some species, such as Alaska pollock, it is clear where the product originated, and time-series data are available to chart changes in production and export patterns over time. However, for other species the origin is uncertain.

Market forces and variation in product forms also make it difficult to track the flow of groundfish products to a particular destination. The final destination of a primary or secondary product depends on the quality of the product, food prices and many other factors. Decisions about what to produce and where to ship it are made by fish buyers and brokers and may not be made until a fishing vessel reports the type of species being harvested, as well as the size, quality and other information.

Product Flows and Markets for Selected Groundfish Products

Notwithstanding the data problems described above, it is possible to summarize product flows for major groundfish products. The following sections present case studies of product flows for pollock, Pacific cod, sole and rockfish harvested in the Alaska groundfish fisheries. Using the official data available and anecdotal information, these case studies are intended to provide a general sense of the types of products made from Alaska groundfish and the movement of those products to their final point of sale.

Pollock

The following sections summarize the major markets for pollock and the principal primary and secondary processors, market developments and transportation issues related to pollock.

Major Markets. Roughly two-thirds of the pollock caught in the Alaska groundfish fisheries is made into surimi, a fish paste product that can be used to make kamaboko (a traditional Japanese food) and numerous other products. In the United States surimi is used to make imitation seafood products such as artificial crabmeat. Most of the surimi is produced for Asian markets, with Japan being the single largest market. The United States is by far the leading country providing pollock surimi to the Japanese market (NMFS 2001). Pollock roe is harvested as an ancillary product during the winter spawning season. The roe is frozen or salted and commands premium prices in Japan. After the roe is stripped from the pollock the fish is further processed into surimi or fillets (NMFS 2001).

The primary market for pollock fillets is the domestic market. Around 15 percent of the total pollock harvest is made into deep skin blocks (fillets with the skin and fat removed), primarily for U.S. fast food restaurants, including McDonald's, Long John Silver's and Burger King. Most processing for this market occurs at the primary processing level. Approximately 3 to 5 percent of the total pollock harvest results in individually quick frozen blocks for the U.S. foodservice industry. This product serves as a substitute for other whitefish fillets. Most of the remainder of the harvest is typically made into traditional blocks that can be used in the European market. All other pollock products, including minced fish, fish headed and gutted, whole fish and oil, account for just 7 percent of the primary product value. Pollock is a fragile fish that deteriorates rather quickly after harvest, so very little is sold fresh (NMFS 2001).

The volume of production of surimi, roe and fillets has fluctuated from year to year, reflecting differences in total harvest volume, the mix of products produced by processors, and product utilization rates. Figure 3.9-18 shows the destination of exports of surimi made from pollock in 1995 and 2001. Most of these exports are to Japan, although there is a small but growing amount exported to South Korea. The balance of exports reach select ethnic markets in primarily European countries (NMFS 2001). Figure 3.9-19 shows that the destination of exported pollock fillets changed considerably between 1995 and 2001.

Principal Primary and Secondary Processors. The most significant primary processors are the inshore plants, motherships, and catcher processors described in the earlier sector analyses (Section 3.9.2). The secondary processors are more difficult to describe. Several companies with ownership positions in primary processing facilities also have secondary processing facilities. At the same time, many other companies with secondary processing facilities have no direct connection with the primary processing facilities.

The only U.S. secondary processing facilities producing surimi products are in Washington State. One facility is owned by Icicle and the other by Trident. Both facilities make surimi products for export and for use by U.S. food manufacturers. The Icicle facility (which produces kamaboko from surimi) is located in Bellingham and has 115 full-time employees. Icicle purchased the *Northern Victor*, a floating inshore processor, and expects all surimi used in the Bellingham plant in the future to be made from Alaska pollock (in the past, some surimi produced at the facility was made from locally-harvested hake/whiting).

Market Developments. As noted above, surimi from Alaska is sold primarily to markets in Japan. Surimi made from pollock is considered to be superior to most, if not all, other surimi; there are no close substitutes (NMFS 2001). Some surimi exported to Japan is made from Pacific whiting harvested off the coast of Oregon and Washington. It is generally acknowledged that the surimi made from Pacific whiting is of lower quality and serves a different niche market (NMFS 2001). Consequently, pollock surimi exports to Japan are price inelastic – the demand for this surimi does not soften much in response to a modest price increase. The effects of price for intermediate products such as surimi may also be cushioned by supply contracts and vertical integration among surimi processors, wholesalers, and retailers in Japan (NMFS 2001).

The demand for traditional surimi products, such as kamaboko, may be declining in Japan. One possible reason is that much of the demand comes from older Japanese. The younger generation in Japan and many other Asian countries appears to prefer western foods. On the other hand, surimi can be used in the production of a variety of foods. The net effect of a decline in demand for kamaboko may not necessarily be a decline in overall demand or production of surimi. Instead, the effect could be a shift in how surimi is used and where it is shipped. A fish buyer interviewed for this analysis stated that food manufacturers in the U.S. may find new uses for surimi because it is a good binder in processed foods and retains water.

As recent as the late 1980s, domestic quick service and seafood restaurant chains mainly used Atlantic cod (NMFS 2001). When Atlantic cod harvests in Canada and the United States declined significantly in the early 1990s, chains such as McDonald's and Long John Silver's moved to the more consistently available Alaska pollock as their primary source of fillets. However, the United States does not supply all the fillets demanded by domestic consumers (NMFS 2001). The balance is made up from imports of Alaska pollock blocks. China is the biggest supplier of U.S. imports of pollock, followed by Russia. Most of the imports from China are of Alaska pollock harvested in Russian waters by both Russian and foreign fleets. Wholesale prices for U.S. produced single-frozen fillets and fillet blocks peaked in 1999 and have since fallen dramatically. In contrast, prices of imported double-frozen fillets and fillet blocks have been much lower and more stable. Since 1999, prices of U.S. products have fallen to close to the levels of imported products. Contributing to the sharp decline in prices for U.S. product has been a dramatic increase in U.S. imports of pollock, which are primarily frozen fillets and frozen fillet blocks.

Transportation. Primary products from pollock that are produced at sea are offloaded to trampers, which take the products directly to secondary processors in Asia, the Lower 48 (Puget Sound area) or Europe. Primary products produced in shoreside facilities typically are shipped by one of the primary marine carriers to Japan or Puget Sound. Marine shippers have charged the same price to ship products from Dutch Harbor to Japan, whether routed through Seattle or not. The price has been the same for the different routes because of the lower cost of cold storage in the Bellingham and Seattle areas. This fact underscores the significance of factors such as size of inventories and cost of storage in determining product flows from Alaska.

Pacific Cod

The following sections summarize the major markets for Pacific cod and the principal primary and secondary processors and market developments related to Pacific cod.

Major Markets. Pacific cod harvested in the Alaska groundfish fisheries enters an international market, but much of it remains in the United States for use in the foodservice industry. Pacific cod fillets are destined primarily for the domestic market. Foreign consumers, especially China, Japan, and Europe, purchase headed and gutted cod for further processing, including the production of salt cod. Salt cod is very popular in Europe, parts of Africa, and Latin America. Although most of the Pacific cod that becomes salt cod is processed outside the U.S., some U.S. processors are once again producing the product domestically for export, as they have at times in the past.

The production levels, mix of primary products, and amount of product exported from Alaska change from year to year for Pacific cod products. Products from other groundfish species show a similar range of variability in product type and distribution paths. Moreover, the final destination of a given product can change dramatically, making it almost impossible to predict the future market for a given product.

Principal Primary and Secondary Processors. No rules of thumb exist for how much Pacific cod is processed in particular facilities because the amount depends on how much cod was harvested by different gear types. In general, freezer longline vessels produce the highest quality product, which goes to salt cod markets. There is a new secondary processing plant in Seattle for salt cod, and additional product is stored in the Seattle area and shipped east. The majority of this product, however, is destined for overseas markets by way of Korea. Pacific cod processed as head-and-gut product or whole fish is exported to Korea, where it is containerized for shipment to Norway and other countries. This product may or may not be reprocessed in Korea. Some of the product that moves through Korea returns to markets in the United States (especially through Boston), but most goes to the major cod markets in Norway, Spain and Portugal for secondary processing or final consumption. Most product sold in Europe and the United States is boneless. Bone-in product (pin bones in) is sold in European markets on an “order only” basis.

Market Developments. Product flows for Pacific cod have changed dramatically in recent years, following the decline of Atlantic cod harvests in the Barents Sea. For example, buyers from Norway and Portugal are now purchasing Pacific cod from Alaska for the first time. Historically, Pacific cod has been considered an inferior product compared to Atlantic cod, but the lack of Atlantic cod has made Pacific cod more acceptable. As a result, prices for head-and-gut cod products from Alaska have doubled in the last three years, and the demand for these products is also increasing in Japan.

With recent declines in the Alaska crab fishery, other gear types harvesting Alaska cod have included pot vessels. Cod harvested by these fishermen typically is brought to shoreplants, where it is made into fillets or head-and-gut product. Pot vessels have a reputation for harvesting high-quality cod, enabling shoreplants to make a high-value primary product.

Sole and Rockfish

The following sections summarize the major markets for sole and rockfish and the principal primary and secondary processors and market developments related to sole and rockfish. Sole and rockfish are combined

in this section because fish buyers and cold storage operators interviewed for this analysis discussed sole and rockfish together.

Major Markets. Approximately 80 to 90 percent of the sole and rockfish harvested in the Alaska groundfish fisheries is shipped to Asia. A portion of this harvest goes from Asia to Europe, and a very small amount is sometimes shipped directly from Alaska to Europe.

Principal Primary and Secondary Processors. Sole and rockfish processed offshore typically are shipped to Asia in headed and gutted or round form. Shore plants produce fillets as well as other products, with some products going to Asia and others remaining in the United States.

The relatively small fillets of sole and rockfish have a high labor cost per pound. This high labor cost makes it more attractive to ship the fish to China, where labor costs tend to be relatively low for secondary processing. Readily available data for sole and rockfish do not indicate the product type or amount exported from Alaska.

Market Developments. A wide range of species of sole and rockfish is harvested in Alaska, some of which are unnamed in the United States. This variety and the lack of name recognition is an issue with U.S. consumers who tend to prefer known products and reinforces the tradition of shipping sole and rockfish products to Asia. Consumers in Asia tend to be less name-sensitive with fish species.

Rockfish from Iceland and Norway has historically been considered superior to most Alaska rockfish. Only select species of rockfish found in Alaska are considered high-quality and easily marketed in countries such as Japan. Very little of the product goes to the Lower 48. Much of the sole and rockfish sold in U.S. East Coast markets, such as New England and Florida, comes from Indonesia. One cold storage manager in Seattle said he expects secondary processing facilities in the United States to handle Alaska sole and rockfish in the future and believes more of this product will move from Alaska to the Lower 48 rather than to Asia.

3.9.7.2 Benefits to U.S. Seafood Consumers

In the past two decades U.S. consumers have been eating more seafood—averaging around 15 pounds per person in the last three years, up from less than 12 pounds prior to1980 (NMFS 2002). Seafood sales to the foodservice sector have risen every year since 1995 (Alaska Seafood 2001). Seafood now represents 20 percent of menu entrees at the nation's top 200 restaurant chains (Seafood.com undated). Much of the increase in the demand for seafood stems from its perceived healthful properties. In recent years, seafood has been credited with having ingredients that reduce heart disease, arthritis and depression and enhance sexual performance (Seafood.com undated). A major impetus in seafood consumption recently occurred when the American Heart Association recommended that people eat fish twice a week for its health benefits.

Products obtained from the Alaska groundfish fisheries have undoubtedly played a major role in meeting this domestic demand for seafood. However, the data limitations outlined in Section 3.9.6.2 make it difficult to estimate the final domestic market value of Alaska groundfish products. For example, NMFS (2001) reported that Alaska pollock ranked fourth overall at 1.57 pounds, after tuna, shrimp, and salmon, in per capita consumption in 1999, but it is not possible to accurately determine how much of the pollock that U.S. consumers purchased was produced in the Alaska groundfish fisheries. Still less information is available on the value of Alaska groundfish products as measured by the level of consumer surplus (i.e., the difference

between the amount consumers are willing to pay for a good or service and the amount they actually pay) accruing to the American public from the consumption of those products.

Nevertheless, it is known that the market for Alaska pollock fillets and Pacific cod fillets is mostly a domestic market, and the demand within the United States far exceeds the available supply (NMFS 2001). The Alaska pollock harvest supplies most of the frozen whitefish, fish sticks, fish patties and imitation crab meat (surimi) purchased at stores and restaurants around the United States (Alaska Seafood Marketing Institute undated(a)). The delicate texture, white color and mild flavor of the pollock's flesh have proven ideal for every segment of the foodservice market from fast food to white tablecloth restaurants. What's more, its stable supply enables restaurants to maintain consistent menu pricing throughout the year. Pacific cod is also a popular item in the foodservice sector because of its versatility, abundance and year-round availability (Alaska Seafood Marketing Institute undated(b)). Most of the product is used in finer and casual restaurants, institutions and retail fish markets.

Despite the high demand for certain groundfish products among U.S. consumers, numerous past studies have indicated that the price elasticity of demand for those products, especially fillets, is fairly high (NMFS 2001). In other words, market price is not appreciably affected by the quantity supplied. This is because the domestic fillet market is competitive in terms of product form (individually quick frozen, block, and twice-frozen), supplying country (Russia and China play major roles), and fillets from other species, including hake and hoki. The U.S. market for all fillets, particularly cod, has also been influenced by the increased production of aquaculture-grown whitefish (NMFS 2001). The species of greatest significance is catfish, but in recent years there have been increases in both domestically produced and imported tilapia. The domestic production of catfish increased from 208 thousand mt in 1993 to 271 thousand mt in 2001,virtually all of it consumed domestically. Furthermore, seafood, in general, must compete with other animal protein sources in the American diet such as chicken, pork and beef. Consequently, the per unit price for pollock or Pacific cod fillets would probably rise only if there were a large decrease in the amount of pollock or Pacific cod fillets supplied to the domestic marketplace by U.S. firms.

The most likely result of a decrease in the domestic production of fillets would be a negative effect on the trade balance, as more fillets are imported to offset the reduced supply. For example, a significant share of domestic pollock fillet demand is presently satisfied by imports. U.S. imports of Alaska pollock more than doubled during the 1990s (NMFS 2001). China, in particular, has emerged as a major supplier of Alaska pollock fillets. Imports of frozen fillets and blocks from China were less than five thousand mt in 1991 but increased to about 68 thousand mt by 2000. The role of China in supplying Alaska pollock fillets to the U.S. market could continue to expand. The “twice-frozen” fillets and blocks from China are generally lower in quality than “single-frozen” U.S. product, but are often substituted for the latter because of their competitive price (NMFS 2001). If retail market supplies are not expected to change due to ready availability of imports, a given regulatory action may have little or no impact on American consumers. Also, the dollar amount of the consumer surplus associated with the domestic consumption of Alaska groundfish likely represents a small fraction of the total net benefits that U.S. consumers receive from all goods and services they purchase or even from all seafood products they consume.

Seafood products obtained from the Alaska groundfish fisheries are also distributed to U.S. consumers outside of established market channels. Amendment 28 to the fishery management plan for Bering Sea and Aleutian Islands groundfish and Amendment 29 to the fishery management plan for GOA groundfish authorize a voluntary donation program for fish taken as bycatch in the groundfish trawl fisheries off Alaska. The seafood

is distributed to economically disadvantaged individuals by tax-exempt organizations through a NOAA Fisheries-authorized distributor. Currently, the authorized distributor is Northwest Food Strategies, a 501 ©) 3 non-profit organization. Northwest Food Strategies accesses seafood products for distribution to the America's Second Harvest network of 200 food banks and food-rescue organizations (Northwest Food Strategies undated). Since it's inception in 1994, Northwest Food Strategies has grown into the leading supplier of seafood to hunger-relief organizations in the country. The fish voluntarily donated by the groundfish fishing industry to Northwest Food Strategies are salmon and halibut that are part of the groundfish fishery prohibited species catch. The salmon and halibut retained and donated under the NOAA Fisheries Prohibited Species Donation Program represent a small but significant portion of the seafood distributed by Northwest Food Strategies. It is estimated that catcher processor companies donate one million seafood meals annually to provide hunger relief. A summary of past/present effects of actions and events on market channels and benefits to consumers is presented in Table 3.9-127.

3.9.8 The Value of the Bering Sea and Gulf of Alaska Marine Ecosystems (Including Non-Consumptive and Non-Use Benefits)

A marine ecosystem and individual species associated with that ecosystem may provide a range of benefits to humans (NRC 2001). These benefits span a spectrum from direct on-site user benefits to benefits accruing to individuals who do not use the marine ecosystem but value the knowledge it exists. Direct, on-site uses of the marine environment are typically associated with consumptive activities (commercial and sport fisheries, resource extraction from the sea bed, etc.); however, non-consumptive activities such as tourism, diving, bird and whale watching, and appreciating the general aesthetics of wild areas are also valuable to humans. The benefits of consumptive activities that produce goods and services exchanged in markets are comparatively easy to evaluate, as the goods and services generated have observable prices.[36] Examples include the seafood produced in commercial fisheries. In addition, some non-consumptive activities such as those associated with eco-tourism may also produce goods and services with observable prices (e.g., wildlife tours).

However, marine ecosystems may also provide goods and services that are not exchanged through markets and do not receive market prices (NMFS 2000). These are referred to by economists as non-market goods and services. Examples include recreational fishing experiences and opportunities for subsistence activities. The values accredited to non-market goods and services, like the values assigned to market goods and services, are variable across a population and may change over time for a given individual. Including non-market goods and services in economic analyses of fishery management decisions is particularly important when considering habitat, ecosystem and many marine mammal issues (NMFS 2000).

This discussion of the range of possible potential benefits provided by the GOA and Bering Sea marine ecosystems and associated species consists of five subsections. The first subsection outlines the array of economic values that individuals may attribute to environmental assets and amenities. The next three subsections examine the various value categories as they relate to the Bering Sea and GOA ecosystems as a whole and to two components of these ecosystems: groundfish and the Steller sea lion. The fifth section discusses values that lie outside the categories of values subject to economic investigation but that may be relevant to decision-making. These values are presented by their proponents as moral imperatives and, thus, do not lend themselves to analyses of economic tradeoffs.

[36] The term "goods and services" is used by economists to denote things or activities that satisfy human wants and needs.

Giving special consideration to the benefits derived from the Bering Sea and GOA marine ecosystems is consistent with the directive of NEPA to consider the significance of potential effects in terms of their intensity or severity of impact (15 CFR 1508.27). Among the factors listed by NEPA that should be considered in evaluating intensity are the unique characteristics of the geographic area such as proximity to ecologically critical areas (15 CFR 1508.27(b)(3)). The Bering Sea and GOA marine ecosystems are among the most productive in the world, and any modification of these ecosystems may have a dramatic effect on the quality of the human environment.

Devoting particular attention to the endangered Steller sea lion is also consistent with the directive of NEPA to consider the intensity of potential effects. A second factor that NEPA states should be considered in evaluating intensity is the degree to which an action may adversely affect an endangered or threatened species or its habitat (15 CFR 1508.27(b)(9)). In 2001, NOAA Fisheries prepared a SEIS on Steller sea lion protection measures, together with a biological opinion. The biological opinion concluded that the effects of the BSAI and GOA groundfish fisheries, as modified by the proposed action implemented by the preferred alternative of the SEIS would not likely jeopardize the continued existence of the western population of Steller sea lions and would not likely adversely modify its critical habitat. However, the continuing controversy about potential impacts of the groundfish fisheries on the Steller sea lion and the availability of additional information on the economic value of the Steller sea lion since the SEIS and biological opinion were completed suggest that further analysis of the possible benefits attributed to this particular endangered species is warranted. Furthermore, it is likely that the perceived benefits of preserving the Steller sea lion also apply to other endangered and non-endangered species associated with the Bering Sea and GOA ecosystems (e.g., various species of whales, dolphins, and seabirds).

3.9.8.1 Categories of Economic Values

Resource economists have developed a taxonomy of wildlife and ecosystem preservation values, although they have divergent opinions of the definitions of some benefits. Moreover, categories of benefits within a given list may overlap. Typically, economists divide the total value an environmental asset may generate into use values and non-use values. Use values involve either in situ contact with the environmental asset in question or personal consumption of products or services derived from the asset (Bishop 1987). Use values include consumptive use values, non-consumptive use values, indirect use values, and scientific values (Table 3.9-125). A summary of past/present effects of actions and events on non-consumptive use values is presented in Table 3.9-127.

Consumptive direct use values can be subdivided into commercial value if the purpose of the extractive activity is to sell products to others; recreational value if the purpose is recreational enjoyment; and subsistence value if the purpose is to provide one's family, or others, with food and no remuneration is involved. Extractive activities that are engaged in for their recreational or subsistence value typically are non-market in nature, but exceptions include certain recreational activities such as charter fishing. The non-consumptive direct use benefits derived from observing wildlife may be non-market in nature or may be purchased from commercial ventures such as those associated with eco-tourism.

In contrast to use values, non-use values are always non-market in nature. Non-use values, also referred to as passive-use values, may include bequest or existence values (Table 3.9-125). These values do not involve personal consumption of derived products nor in situ contact. They are generated from people's inter-generational altruistic concerns or from the utility people receive from knowing that a particular asset

exists or is being preserved (Bishop 1987). Existence value may be highly sensitive to the amount of information acquired, i.e., small changes in information or knowledge about a species may produce large shifts in existence value for that species (Stevens *et al.* 1991). It follows, therefore, that improvements in communication technology may lead to significant increases in existence value. For example, the arrival of the Internet has greatly enhanced the ability of the general public to access, at low cost, information about endangered species and other environmental assets.

Resource economists have taken the decomposition of the basic components of value in a species or ecosystem a step further by incorporating uncertainty into an individual's choice. For example, individuals may be willing to pay a premium for retaining an option for future use of a good or service, although they may not currently use it. This so-called option value exists under conditions of uncertainty about the future demand of an environmental asset. An extension of option value known as quasi-option value represents the value derived from postponing a decision about preserving a species or ecosystem in order to gain more knowledge in the future. The MSA acknowledges the uncertainty inherent in fisheries by stating that the term "conservation and management" refers, in part, to measures designed to assure that "...irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and there will be a multiplicity of options available with respect to future uses of these resources...." (Sec. 3(5)).

While it is important to recognize that the opportunity costs of management decisions that result in irreversible species or ecosystem losses may be particularly high, it is also important to note that some individuals may hold a positive value for avoiding losses of part of a species' population even if recovery is fairly rapid (Bishop and Welsh 1992) – witness the opposition by some members of the public to the recent gray whale hunt by the Makah people of the Pacific Northwest, despite the fact that NOAA Fisheries deemed the gray whale (*Eschrichtius robustus*) stock to be in good condition and capable of withstanding a restricted harvest. It is likely that for some opponents to the whale hunt the harvest of even a single whale is one too many because of the value of the special qualities they ascribe to a living whale or because of the sympathy or empathy they hold for animals in general.

3.9.8.2 Possible Economic Values Assigned to the Bering Sea and Gulf of Alaska Ecosystems

In this section, possible economic values ascribed to the Bering Sea and GOA ecosystems as a whole are discussed. To date, there has been no attempt to measure all of these values. A management decision that preserves sufficient area of habitat to conserve the ecosystem of which the endangered Steller sea lion is a part would tend to increase the probability of the species' survival. Consequently, an implicit value of protecting the Bering Sea and GOA ecosystems may be the value that people assign to preservation of the Steller sea lion (Section 3.9.8.4). Of course, preserving habitat would also help safeguard populations of other types of animals, and one would expect this habitat protection to be worth more than just the benefits provided to a single endangered species. Similarly, the value of the Bering Sea and GOA ecosystems is much greater than the value of groundfish fisheries (Section 3.9.8.3).

Due to the interconnectedness of the various elements of an ecosystem and the variety and complexity of ecological outputs, the tools of economic analysis may be of only limited usefulness. Marine ecosystems world-wide provide important services to humans, such as food production, climate regulation and nutrient storage and cycling. These ecosystem benefits may not be independent from one another. Further, the specific functions of the physical, chemical and biological processes occurring in a given ecosystem, and the beneficial outcomes for people that result from these functions, are often poorly understood. These problems, in addition

to the lack of market prices, raise formidable challenges to the estimation of benefits. Nevertheless, it is still possible to broadly characterize in qualitative terms possible benefits of the Bering Sea and GOA ecosystems.

Consumptive Direct Use Value

The Bering Sea is the most productive marine ecosystem off the United States and one of the most productive in the world (NMFS 1998). The northern GOA is also one of the world's most productive ecosystems (EVOS undated). As would be expected in such productive ecosystems, the consumptive direct uses are highly valued. These uses include harvesting various marine and anadromous species for commercial, recreational and subsistence purposes.

The Bering Sea and GOA ecosystems encompass the harvesting areas, spawning grounds, recruitment areas and/or migration paths of nearly all of the fish, marine mammal and invertebrate species of consumptive value in Alaska. In 1995, seafood as a commodity statewide contributed $1.4 billion to the Gross State Product (4 percent of the total Gross State Product) and generated 7 percent of total employment statewide. The Alaska Sport Fish Harvest Survey shows that more than 432,000 anglers fished about 2.6 million angler-days and harvested almost 3.3 million fish in 2000 (Walker *et al.* 2001). Subsistence fishing and hunting continue to figure prominently in the household economies and social welfare of some Alaskan residents, particularly among those living in small, rural villages (Wolfe and Walker 1987). Of the estimated 43.7 million pounds of wild foods harvested in rural Alaska communities annually, subsistence fisheries contribute about 62 percent – 60 percent from finfish and 2 percent from shellfish. On average, this subsistence fisheries harvest provides about 230 pounds of food per person per year in rural Alaska (Wolfe 2000). Further, subsistence remains the basis for Alaska Native culture and community. In rural Alaska, subsistence activities are often central to many aspects of human existence, from patterns of family life to artistic expression and community religious and celebratory activities. Additional information on subsistence activities in Alaska is provided in Section 3.9.5.

Non-Consumptive Direct Use Value

The non-consumptive direct use benefits of healthy marine ecosystems are important to many Alaska residents. They may value these ecosystems for recreational, aesthetic, and spiritual reasons. For some individuals, they may be a key benefit to living in the state and integral to a "sense of place."

Non-consumptive direct uses of the marine environment may also be important to visitors to Alaska. For example, an increasing number of tourists are arriving in Alaska aboard cruise ships. The proportion of summer visitors entering Alaska by this mode of access increased from 26 percent in 1989 to 42 percent in 2001 (Northern Economics, Inc. 2002). An integral part of the cruise ship experience is viewing the state's scenic coastal environment.[37] According to one cruise ship line, vessel passengers can "enjoy stunning vistas of snow-capped mountains, majestic blue-ice glaciers, and an abundance of wildlife" (Carnival Cruise Lines undated). On the other hand, it is uncertain how important a pristine marine ecosystem is to Alaska's tourism industry. To paraphrase one observer, "Do passengers on a cruise ship need know that the food web is intact [in order for Alaska's marine environment to continue to be a major tourist attraction]?" (Colt and Huntington 2002). The speed and height of cruise ships and their distance from shore limit close views of natural features and wildlife. Furthermore, cruise ships provide a range of onboard activities unrelated to a particular location.

[37] Cruise ship voyages typically originate in Seattle or other West Coast cities and visit several destinations in Alaska.

It is probable that visitor expectations and experiences differ among various groups. For example, the non-consumptive value of the Bering Sea and GOA ecosystems may be substantial only for certain tourists, such as those who purchase kayaking tours, wildlife viewing excursions and similar services that afford individuals a closer look at marine wildlife and other local fauna. At present, information about the expectations or degree of satisfaction of tourists visiting Alaska is limited.

Existence Value

A significant component of the overall benefit of Bering Sea and GOA ecosystems may be from existence (non-use) value. For example, the following excerpt from a recent publication of the World Wild life Fund and Beringia Conservation Program suggests that the Bering Sea ecosystem may have significant existence value due to its distinctive qualities:

> *On every scale, in all its complex dynamics, the Bering Sea is one of our planet's most spectacular ecological regions – that rare place where nature's creatures and biological processes are still providing a wealth of benefits that attract and sustain an extraordinarily abundant diversity of life* (World Wildlife Fund and Beringia Conservation Program undated).

The abundant waters of the Bering Sea and GOA support the richest assemblages of marine mammals and seabirds in the northern hemisphere (NPFMC 1994). The benthic invertebrate community off Alaska consists of at least 472 species of invertebrates making up the macroinfauna (Low *et al.* undated). More than 100 million birds of over 100 species depend on Alaska marine ecosystems during some part of their life cycle. At least three-fourths of these species breed in Alaska, and the rest are visitors from a wide variety of locations throughout the Pacific Ocean. In addition, the Alaska marine environment has 37 stocks of more than 25 species of marine mammals (Low *et al.* undated).

It is likely that some people derive pleasure from the contemplation of the varied life forms existing in the Bering Sea and GOA ecosystems and would be willing to pay to preserve the structure and integrity of those biological communities even if they never directly "experience" them. For these individuals, the knowledge that these communities exist, relatively free of human disturbance, is enough.

3.9.8.3 Possible Economic Values Assigned to Groundfish

The most evident economic value of BSAI and GOA groundfish resources are their consumptive direct use value in a commercial context. This value accrues to the different members of society who make a living harvesting, processing and distributing groundfish products and who purchase and consume these products. The economic value firms and communities derived from the commercial harvest and processing of groundfish are described is Sections 3.9.2 through 3.9.4. The value accruing to distributors and consumers of groundfish products is described in Section 3.9.7. The groundfish products produced and consumed are market goods since they are bought and sold in normal commerce and their value is revealed in market prices.

In comparison to the commercial consumptive value of groundfish, the non-commercial consumptive value of these resources is very small. While no groundfish recreational harvest data for the EEZ are compiled, it would not be unreasonable to assert that the total recreational harvest in the BSAI and GOA is trivial. This is so for several reasons. First, for the vast majority of the geographic area adjacent to the BSAI and GOA EEZ, local human populations are quite small and relatively isolated. In these remote areas of Alaska, most

of the non-commercial take of groundfish would more appropriately be regarded as subsistence harvests rather than recreational fishing. In general, groundfish harvests play a minor role in subsistence activities. Additional information on the subsistence use of groundfish is presented in Section 3.9.5. Second, the physical environment of much of the BSAI and GOA EEZ limits recreational fishing for groundfish to near shore areas in the vicinity of population centers. All such fishing activity would be expected to occur within state waters, and thus, would be managed by the ADF&G. Third, most of the BSAI and GOA groundfish harvest is composed of species (e.g., pollock) that generally are not regarded as sport fish.

Aside from its consumptive direct use value, groundfish may have an indirect value. For example, juvenile pollock and other groundfish may be important prey for other species that people value, such as the Steller sea lion. Moreover, groundfish may play a crucial role in the overall function and stability of the Bering Sea and GOA marine ecosystems.

3.9.8.4 Possible Economic Values Assigned to the Steller Sea Lion

Consumptive Direct Use Value

Although there are exceptions, endangered species generally have little or no consumptive direct use value because of their low numbers. Commercial hunting of the Steller sea lion, which took large numbers of the animals until as recently as the 1970s, no longer takes place. Steller sea lions were historically a primary source of food for inhabitants of the Aleutian Islands. In addition, clothing, boots, and boat coverings were made from skins. The Subsistence Division of the ADF&G has surveyed subsistence hunters about their Steller sea lion harvests since 1992. According to the ADF&G, statewide subsistence harvests of Steller sea lions have reportedly dropped, from an estimated 549 animals in 1992, to an estimated 178 animals in 1998. Almost all of these harvests are from the western population and the majority are made by Aleut hunters in the Aleutian and Pribilof Islands. Subsistence analysts at ADF&G suggest that the decline in Steller sea lion harvest is connected to (a) increased scarcity and consequent reductions in subsistence harvest success per unit of effort, and (b) conservation related concerns about the health of Steller populations among subsistence hunters (NMFS 2001). Given the continuing decline of the western population of Steller sea lions, the consumptive value of these animals is likely to remain low. Additional information on the subsistence use of the Steller sea lion is available in Section 3.9.5.

Non-Consumptive Direct Use Value

The rookeries and haulouts of the Steller sea lion are usually located on relatively remote islands. Furthermore, buffer zones have been established near the largest breeding islands, and vessels are not permitted to go closer than three miles to these rookeries. Consequently, the opportunities for people other than scientists to observe a live Steller sea lion in the wild are somewhat limited. However, this species occurs in a number of national parks in Alaska (Kenai Fjords National Park, Glacier Bay National Park and Preserve, and Katmai National Park and Preserve), and a number of private companies offer boat tours in or around the parks that let visitors view Steller sea lions and other types of Alaska wildlife. The non-consumptive value that direct encounters with the Steller sea lion might generate are likely similar to those described by Ching (1994:36) for the Hawaiian monk seal *(Monachus schauinslandi*), another endangered pinniped:

> *Events like those ...are precious indeed as many people are experiencing the joy of watching monk seals in the wild without causing them stress. Something magical happens when people actually get*

to see an endangered animal in real life. It instills within them a sense of protective enthusiasm, thus strengthening conservation efforts.

Scientific Value

The Steller sea lion may be perceived by some as having some yet unrealized biomedical value that renders it worth preserving (i.e., the species has a quasi-option value). Several current lines of research indicate that some pinnipeds may be useful in human medicine. To cite some examples, an examination of the physiological factors that render the internal organs of seals resistant to anoxia may improve human organ transplants (Kooyman 1981); studies of the Weddell seal's (*Leptonychotes weddelli*) ability to routinely recover from near total lung collapse during deep dives may prove useful in understanding sudden infant death syndrome (Kooyman 1981); and investigations of what are apparently normal sleep apneas in the northern elephant seal (*Mirounga angustirostris*) may provide insights into similar but more pathological events seen in humans (Castellini 1994). These potential benefits may suggest to some individuals that the Steller sea lion could also have some valuable biomedical use in the future.

Indirect Value

The complexity of ecosystem relationships and interconnectedness of the various elements may cause the removal or disturbance of one part of the ecosystem to affect the functioning of many other components of the ecosystem. For example, the Steller sea lion may be an important component of the food web, serving as prey for larger species. The exact role that the Steller sea lion plays in maintaining the integrity of the GOA and Bering Sea ecosystems is uncertain. Such uncertainty is not unusual; knowledge of ecosystem relationships are often incomplete, and the results of disturbance are thus to some extent unpredictable. To have indirect value the Steller sea lion does not necessarily have to be a "keystone species" on which the persistence of a large number of other species in the ecosystem depends. As Ehrlich and Ehrlich (1981) have noted, the removal of any particular species may in itself not be catastrophic, but its occurrence increases the likelihood that the next extinction could unravel the whole ecosystem.

Existence Value

Non-use values may be the most important benefit derived from some endangered species, simply because species become endangered due to their small populations, which means that many people are unlikely to have seen or had much tangible experience regarding these species. People demonstrate their existence values in the marketplace by donating funds to private organizations that support activities to preserve endangered species. However, whether people enjoy existence values of resources is not contingent upon whether they donate money to support a cause. The fact that some individuals are willing to donate money is just the most obvious manifestation of these existence values.

The discussion by Metrick and Weitzman (1996) of possible factors that affect the magnitude of existence value can be used as a basis for speculating about the nature and relative magnitude of the existence value of the Steller sea lion. First, the authors note that people often speak of the large amount of attention paid to "charismatic megafauna." Presumably, therefore, the existence value of a species may be a function of its charisma. Metrick and Weitzman were unable to identify a satisfactory measure of charisma in the context of endangered species, but they note that eye-size or eye-body ratio have been suggested. Based on these eye-related criteria the Steller sea lion would be rated as highly charismatic. In any case, Steller sea lions are

large mammals, and sea lion pups have a "cute and furry" visage – characteristics that are typical of some high-profile threatened and endangered species that people are willing to protect.

Another factor that may influence the magnitude of existence value is the degree to which a species is considered to be a higher form of life and possibly possess (anthropomorphic) capabilities for feeling, thought and pain (Metrick and Weitzman 1996, Kellert 1986). Certain characteristics of sea lions, such as the maternal care that the female provides for her pup, the playful behavior of young sea lions or the ability of the sea lions to vocalize and communicate with each other, may be perceived by some people as indicators of a higher life form. While none of these attributes proves that the Steller sea lion possesses human-like intelligence or emotions, people may "identify" with these characteristics and interpret them to mean that sea lions do, in fact, represent a relatively advanced form of life.

Finally, Metrick and Weitzman argue that, since we may have existence value for biodiversity as a whole, some measure of the amount that a species adds to this diversity may play a role in deciding how much people are willing to pay to preserve it. Genetic distinctiveness means the number of genes acquired since the species split off from its nearest common-ancestor. For Steller sea lions, the question might be, how genetically distinct are the eastern and western stocks that occur in U.S. waters. NOAA Fisheries recognized the two distinct population segments in 1997 based on geographic distribution, differences in population dynamics and mitochondrial DNA data. Other unique characteristics of the Steller sea lion may also influence people's perceptions that these animals should be valued for their contribution to biodiversity. For example, the Steller sea lion is the largest of the sea lions, with males reaching over 1,700 pounds in weight and 10 ft in length.

An Estimate of the Economic Value of an Expanded Steller Sea Lion Recovery Program

As noted previously, market prices express the value of environmental assets in monetary terms if these assets are bought and sold. However, because other benefits of environmental assets are less readily translated into dollar values, resource economists have developed an array of valuation techniques that do not rely on market data. One such technique is the contingent valuation method (CVM). CVM employs survey techniques to ask people about the values they would place on certain environmental assets or other non-market commodities if markets did exist or if other means of payment were in effect. It is called "contingent" valuation because people are asked to state their 'willingness to pay', contingent on a specific hypothetical scenario and description of the environmental service.

CVM allows for the estimation of the full range of species and ecosystem preservation values set forth in Table 3.9-125,and it is the only method available for estimating non-use values directly. When individuals are asked in CVM studies to evaluate an environmental asset they make a holistic judgment based on the configuration of benefits they believe will accrue to them (Mitchell and Carson 1989). In other words, the value expressed by a respondent represents the sum of all the types of use and non-use values he or she assigns to the good or service in question. Generally, researchers applying CVM do not attempt to assess each separate type of value. It is also important to note that respondents may make associations among environmental goods that the researcher had not intended. For example, a valuation of a particular species may include implicit valuation of the components of the ecosystem that support that species (Loomis and White 1996).

A recent CVM study provides an empirical point estimate of the total economic value attributable to protection (and enhancement) of the western Steller sea lion stock (Turcin and Giraud 2001; Giraud *et al.*

2002). This study constructed and administered a questionnaire survey that included a closed-ended CVM question formatted similarly to a typical public goods referendum. Specifically, the survey described a hypothetical expanded Federal Steller sea lion recovery program that would double research funding and increase the restrictions of commercial fishing around the western stock of the Steller sea lion's critical habitat in the GOA, Bering Sea and North Pacific Ocean. The survey noted potential impacts to Alaskan coastal communities that depend on the fishing industry as well as potential benefits from the expanded program. However, the survey explicitly stated that biologists are unsure why the sea lion populations have been declining and gave no guarantee that the expanded program would ensure species recovery. This information was followed by the question, "If the Expanded Federal Steller Sea Lion Recovery Program was the only issue on the next ballot and it would cost your household $X in additional Federal taxes every year for the next Y year(s), would you vote in favor of it?" The dollar amount and payment duration were filled in by the analysts prior to administering the questionnaire. By varying the printed dollar amount across the sample of respondents, the voter referendum format allowed the analysts to statistically trace out a demand like relationship between the probability of a "yes" response and the dollar amount. The researchers have not yet investigated temporal elasticity of 'willingness to pay' estimates, and only a one-year payment duration was analyzed.

The survey was administered to a sample of households in three study areas: 1) the Alaskan boroughs that contain Steller sea lion critical habitat, 2) the entire state of Alaska; and 3) the entire United States. Because the benefits of preserving Federally listed threatened and endangered species are national in scope, both the value per household and number of households to aggregate over should include all U.S. households (Loomis and White 1996). The Steller sea lion CVM study found that the value of an expanded recovery program for the species in the United States sample was positive and substantial. The estimated mean one-time payment was $100.22 per household. If the average value per household is adjusted to account for non-responses with the assumption that they represented a zero 'willingness to pay', the mean benefit is $61.13. With 101,562,700 households throughout the nation, and $61.13 value per household, 'willingness to pay' totals about $6.2 billion for the expanded Federal protection program for the western stock of the Steller sea lion. The 95 percent confidence interval is from $5.8 billion to $16.17 billion. This economic value estimate of an expanded recovery program may be conservative, as the valuation responses were treated as household responses rather than individual responses. Treating the responses as individual responses would increase benefits substantially.

The results of CVM are often highly sensitive to what people believe they are being asked to value, as well as the context that is described in the survey. Given the vague outcome of the Steller sea lion protection program described in the above CVM study, it is somewhat uncertain what respondents were evaluating. A more definitive value of the Steller sea lion might have been obtained if a link had been established between an expanded protection program and a well-defined discrete outcome, such as a specific probability that the western Steller sea lion population would recover.

Economists acknowledge that, in general, questions of validity, bias and reliability persist in the use of CVM to evaluate environmental assets. In 1992, NOAA commissioned a "blue ribbon" panel to advise the agency on the use of CVM for measuring non-use values (Arrow *et al.* 1993). The panel concluded that CVM studies can produce estimates reliable enough to be the starting point for a judicial or administrative determination of natural resource damages, including loss of non-use values, as long as certain sampling and survey design guidelines are adhered to. It is beyond the scope of this analysis to critique the methodology employed by Turcin and Giraud (2001) and Giraud *et al.* (2002) to evaluate the benefits of an expanded program to preserve

the Steller sea lion, but the use by these analysts of a willingness-to-pay and dichotomous choice format is consistent with guidelines set forth by Arrow *et al.* (1993). Nevertheless, it is important to emphasize that CVM is based on asking people questions, as opposed to observing their actual behavior, which is a source of considerable controversy among economists, policy makers, and others. The conceptual, empirical, and practical problems associated with developing dollar estimates of economic value on the basis of how people respond to hypothetical questions about hypothetical market situations are a continuing source of debate.

3.9.8.5 Alternative Value Paradigms

Apart from debates about the technical acceptability of CVM with respect to its validity and reliability, there are criticisms of the economic-utilitarian paradigm underlying the economic valuation of at-risk species and ecosystems. A number of these criticisms contend that economic valuation methods such as CVM are inherently inadequate because they capture only the instrumental value to current members of society. For example, Berrens *et al.* (1998) note that irreversible species or ecosystem losses involve inter-generational equity issues since they constrict the choice sets of future generations. Economic valuations are based on the preferences of the current generation and neglect the ethical issue of the inter-generational allocation of natural endowments. Preserving species where positive net benefits are to be earned is obviously a good idea, but preserving species only when doing so meets economic efficiency criteria may place future generations in a disadvantaged position (Bishop 1993).

Other critics focus on the fact that economic valuations are rooted in anthropocentric or human-centered benefits, that is, these valuations rest on the basic assumption that value derives from what people find useful. However, some would argue that human uses and the values to which they give rise are not deserving of any special consideration when it comes to a decision on whether to preserve a species and its habitat (Albers *et al.* 1996). According to one interpretation of this view, nature has rights; to exploit nature is just as wrong as to exploit people (Nash 1989). Another interpretation is that non-human species are intrinsically valuable, independent of any use they may be to humans (Callicott 1986). The latter conviction may be related to religious principles, such as a belief in the sacredness of all or certain life forms.

All of these "moral arguments" are inconsistent with the economic paradigm of trade-offs between money and wildlife species or ecosystems because they present individuals with the moral imperative that we ought to preserve plants and animals (Stevens *et al.* 1991). As Costanza *et al.* (1997) and Pearce and Moran (1994) note, concerns about the preferences of future generations or ideas of intrinsic value translate the valuation of environmental assets into a set of dimensions outside the realm of economics.

It is difficult to gauge how prevalent such ethically motivated values are among members of the general public. For example, according to a 1997 public opinion poll conducted in the U.S., only 6 percent of the respondents who advocated an end to the harvest of the Minke whale (*Balaenoptera acutorostrata*) indicated that their opposition to whaling stemmed from animal rights concerns (Aron *et al.* 2000). On the other hand, when a recent Gallup poll asked Americans to indicate the degree to which they agree or disagree with the goals of the animal rights movement, 29 percent expressed strong agreement, 43 percent indicated some agreement and only 25 percent were strongly or somewhat opposed (The Gallup Organization 2000). Additional in-depth public surveys are needed before we can better understand people's motivations for supporting efforts to protect endangered species such as the Steller sea lion and ecosystems such as those of the Bering Sea and GOA.

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